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LECTURES

ON

DISEASES OF THE HEART.

BY

EDWIN M. HALE, M.D.,

Special Lecturer on Diseases of the Heart, and Professor of Medical Botany and Pharmacology in Hahnemann Medical College, Chicago; Author of "New Remedies," etc., etc.

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TO

David S. Smith, M.D.

OF CHICAGO,

THE FIRST HOMŒOPATHIC PHYSICIAN

IN THE NORTHWEST;

THE FIRST PRESIDENT OF HAHNEMANN MEDICAL COLLEGE OF CHICAGO;

THE FIRST PRESIDENT OF THE ILLINOIS STATE HOMŒOPATHIC MEDICAL SOCIETY;

THIS VOLUME IS

RESPECTFULLY DEDICATED.

PREFACE.

The Lectures contained in this volume were delivered before the Class of HAHNEMANN MEDICAL COLLEGE OF CHICAGO, in the winter of 1870–71. I was appointed by the Faculty of the College to give a special course of Lectures on Diseases of the Heart, and the satisfaction manifested by the class has emboldened me to publish them, and to which I have added considerable, and subjected them to careful revision. As it is manifest that nothing new or original relating to the etiology and diagnosis of diseases of the heart could be presented, I cannot be criticised for quoting largely from standard authorities on that subject. The treatment, however, is in accordance with the doctrines of the homœopathic school, or rather in accordance with my interpretation of the Law of Cure discovered and taught by Hahnemann. While I accord the largest liberty in the matter of dose, I have advised the quantities that have been most successful in my hands.

As this is the only work on Diseases of the Heart which has appeared in homœopathic literature, I hope it will meet with a favorable reception, and be the means of affording relief to those suffering from the diseases therein treated of.

CHICAGO, *July*, 1871.

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PART I.

FUNCTIONAL DISORDERS OF THE HEART.

LECTURES ON

DISEASES OF THE HEART.

INTRODUCTORY LECTURE.

The Wonders of the Heart — Its Functions — Increased Frequency of its Diseases — Its Anatomical Peculiarities — Its Circulation — Its Innervation —Its Nervous System — When it Begins to Beat — Pathological Deductions.

GENTLEMEN: I approach the subject upon which I have been appointed to lecture with the fullest and deepest sense of its importance. Diseases of the heart, from their very nature, and the paramount importance of the organ affected, should claim the interest and profound attention of all thinking and conscientious physicians. I do not wish to exaggerate the importance of cardiac diseases, or give a false estimate of their frequency, but I have no hesitation in asserting, that my observations in a large practice of twenty years have convinced me that diseases of the heart, and especially functional disorders of that organ, have largely increased within the last decade. It may be owing to the fact that the latter half of my years of practice have been spent in a great city, that I have come to this conclusion. The intense strain upon the nervous energies incident to the business and pleasures of a city life, do certainly have much to do in the causation of certain heart diseases. In the country, life is calmer, and its tide flows slower, and the vital energies are less subjected to violent aberrations.

In view of these facts, it becomes us to study well this organ—the heart—in all its relations, not only anatomically, physiologically, but psychologically. And in order to do this, we must first inquire into the character of this organ. Is it merely an appendage to the body—an organ of elimination or secretion? Or is it the centre of the blood-system, just as the spinal cord is the grand centre of the nerve-system, and the brain the centre of the mental forces?

As the brain animates the body with intention and purpose, and the lungs give it corresponding motion, the heart, as the blood's executive power, gives corporeal substance to the frame, inasmuch as the body itself arises from the blood. The existence of the human machine depends upon the heart, but its usage upon the lungs and brains. The heart is the source whence the finished blood descends to the organs throughout the system, and, as the life is in the blood, the heart is the agent for bestowing that life upon the organization. In a word, the heart, or blood, determines the fleshly tenement.

ITS ANATOMICAL PECULIARITIES.

Anatomically the heart is a conical, hollow muscular organ, lying obliquely in the chest, between the two lungs, the base of the cone pointing upward in the direction of the right shoulder, the apex pointing to the space between the fifth and sixth ribs. It rests upon the tendinous portion of the diaphragm, which is the partition between the chest and the abdomen, and it is encased in a peculiar bag or capsule, the pericardium, which consists of two layers; the outer, fibrous, by which the pericardium is attached to the great vessels at the root of the heart; the inner, a serous layer, continuous with the serous membrane which covers the outer surface of the heart. The cavity between the heart and pericardium, thus lined by a serous covering, generally contains more or less fluid, whereby the heart is lubricated on the outside, and its local motions are rendered easy.

The heart comprises four cavities, two auricles, and two ventricles; one auricle and one ventricle being on each side, and the right pair of cavities being devoted to the circulation of the venous blood, the left pair to that of the arterial blood. The auricles are at the top, constituting the base of the heart; the ventricles form the apex; the latter are much stronger than the auricles, consisting of very thick muscular walls, the reason of which we shall see presently.

THE CIRCULATION OF THE BLOOD.

The heart is a peculiar muscle, and when any of its four cavities contract, they have the power of expelling their contents, the force of the expulsion being the prime mover of the circulation of the blood. We may begin the circle where we please and we shall find that it returns into itself. Starting, for instance, from the *left* ventricle, we see that the blood is driven, by the contraction of that cavity, into the aorta—the highway which leads into all the arteries of the body; through these the blood is discharged into the veins, which unite to form at last only two great trunks, the vena cavæ, which are again the thresholds of the heart, and debouch into the right auricle. The blood which has now passed from the left ventricle to the right auricle, has still a journey to make before it completes its course. Accordingly, from the right auricle it is forced into the right ventricle, and by the right ventricle into the pulmonary artery, which conveys it to the lungs, where it ramifies through the multiple branches of that artery, and whence it is brought back by the pulmonary veins, forming ultimately four large trunks, which empty into the heart's left auricle, by the contraction of which the blood is next forced into the left ventricle, to the place from which we began.

Without entering into a description of the complete circulation of the blood throughout the body, with which you are all doubtless familiar, we will consider a more important and interesting subject, namely: the circulation of the blood in the heart *itself*.

THE CIRCULATION IN THE HEART.

That there *must* be a circulation in and through the heart is evident; for how else could the heart be nourished? The heart is supposed to be nourished by the *coronary* vessels; they are called coronary from *corona*, a crown, because they run in crowns or coronal circles around the heart. They arise from the aorta, close beside the semi-lunar valves, and running around the base of the heart, and sending branches down the lines of partition between the four-fold chambers, they form a kind of vascular cage-work in which it is contained. The coronary veins, said to begin from the minutest twigs of the coronary arteries, by their considerable branches for the most part accompany those of the arteries, and discharge themselves by one, two, or three orifices, into the right auricle. The interior of the four cavities of the heart is not a smooth, even surface, but is rendered extremely irregular by muscular columns, projections, and partitions; it is scooped, channelled, and caverned, besides which, on the walls of the cavities there are minute openings, the foramina of Thebesius, which are supposed to be the mouths of little veins.

It is a curious fact that nearly all the old anatomists, and some also of the moderns, have suspected a puzzle in these coronary vessels. They come from the aorta, and run backward to the heart. In a certain proportion of cases, estimated as 5 in 20, one or more of their orifices lies behind the semi-lunar valves, and such orifices, it is clear, cannot receive the streams propelled from the heart, because it lays down the valve flat upon them, and effectually closes them. As, therefore, nature's law must be constant, it was argued that what holds of one orifice must hold of all, and that the blood runs back into the coronaries from the aorta when the heart's contraction ceases. This was Boerhaave's opinion.

Swedenborg, however, one of the profoundest anatomists and physiologists of any age, propounded another view. He argued that the raising up of the semilunar valves during the contraction of the heart, when the blood is expelled into the aorta, precludes its passage then into the coronaries, and that the stretching of the coronaries, and their pressure by the full aorta, contributes to the same preclusion. He held that the coronary arteries do not arise from, but terminate in the aorta; that they are veins relatively to the heart, although running into the beginning of the arteries of the body. The doctrine, in brief, is this: that the heart, as the head of the vessels and the fountain of the blood, itself requires the firstling blood for the exercise of its noble offices, and cannot hold its life by tenure from one of its own arteries, which would be to invert all ideas of the order of nature.

The heart is already full of blood, and if fluids, or fluid persons, like solid persons, move with greater velocity in proportion to their life, the best blood in this race will continually outrun the rest, and always first in the heart, will skirt along its porous walls. Now, what structure do we find upon these walls, but caverns, jagged cavities, and at the bottom of these a number of little holes, the foramina of Thebesius. Into these caverns, then, miniature ventricles in the great ventricle, hearts of the heart, the quickest blood is received, and the pores open with all their hearts to take it in. And when the heart contracts, it drives out the general blood of the body into the grand aorta, but its own particular blood, detained in the cavernous lacunæ, it squeezes, slippery with spirit, through its walls, into its muscular substance, and thence onward and outward to the surface, into the coronary arteries and the coronary veins, from which there is a reflux, when necessary, into the auricles and ventricles.*

According to this explanation, which we cannot hesitate to accept, the heart has a circulation of its own, which gives it a power to maintain its own constancy in the midst of the fluctuations of the blood, and to make it the head, ratio, or balance, as well as the heart, of the too-mobile circulation.

Again, according to this view, the varying quantities of the blood returned upon the heart, find an outlet through the walls of the heart itself, and equilibrium is thus maintained by the coronary vessels; so that the heart, *plus* the coronaries, equals all the forces of the circulation; while the heart, *minus* the coronaries, is a comparatively regular force uninfluenced by the general state of the system. Were it not for such provision, the heart would be at the mercy of extraneous influences; the most important organ of the trunk would have no stability, would in the end yield, and be distended into a bladder or membrane, incapable of anything but the most passive recipiency.

---

* Dr. Wilkinson—"The Human Body and its Connection with Man."

Next to the consideration of the circulation of and in the heart, and its nutrition, the next in importance is

THE INNERVATION OF THE HEART,

Or, the nervous circulation or nervous forces which impel and regulate the motion of this wonderful organ. The heart is endowed, above all other organs, with a property which has been termed *irritability*, by which is meant the capability of being easily excited to movements of contraction alternately with relaxation.

After the heart has been removed from the body, and has ceased to contract, a slight irritation will cause it to execute, not one movement only, but a series of alternate contractions and dilatations, gradually diminishing in vigor until they cease. The contraction begins in the part irritated, and then extends to the rest. And it appears that it is the muscular tissue alone that possesses this peculiar property, for if the parts of the heart experimented upon are connected by tendons the irritation will not extend through such connection. This irritability is less speedily lost in cold-blooded than in warm-blooded animals. The heart of a frog will go on pulsating for many hours after its removal from the body; and the heart of a sturgeon when inflated with air, continues to beat until the auricle absolutely becomes so dry as to rustle during its movements.

Not only will the *whole* heart continue to beat when removed from the body, but even small and isolated portions will contract and relax with great regularity. Cut the heart lengthwise into two halves, and each half will continue beating. Cut it across, through both auricles and ventricles, and both sections will beat as before. The auricles will persist in their rhythmical action when cut off above the auriculo-ventricular rings, and the apex of the heart will do the same when separated from the rest of the ventricles.

This is one of the spectacles which assail the mind of the student with somewhat of a tremulous awe. The beating of the heart, which from his childhood he has learned to associate, in some mysterious manner, with life and emotion, he here sees occurring under circumstances removed from all possible suggestions of emotion or life. All connection with the spinal cord is severed. The brain cannot send to it any voluntary influence. The blood no longer courses through it, to give it motion by contact or otherwise. What then causes the heart and each separated portion to continue their rhythmical pulsations? This irritability does not depend upon the cerebro-spinal system, for it has been proved that the heart's action will continue in the body after the brain and spinal cord have been removed. For many years no explanation could be given of this wonderful self-life of the heart. We now know that the heart has a *nervous* system of its own, as well as a *circulation* within itself.

In the substance of the heart is a complete little nervous system, consisting of ganglia and nerves, and is not made up of the nerve filaments which come from the *pneumogastric* nerves. From these ganglia nerves are distributed through its muscular substance. It is to this nervous apparatus that we must ascribe the spontaneous action of the heart; for if any part be severed form all connection with the ganglia the pulsations will cease at once, but if the smallest severed portion of a heart contains a ganglion the pulsations will continue. In other words, it retains its irritability. The movements during life or death are due to these ganglia. No other ganglia in other parts of the body retain their power after the circulation has been destroyed. In view of this, we might almost believe the fanciful notion that the heart was a sentient organism—a being within a being!

But the most wonderful thing about the heart remains to be told. *It pulsates in the embryo long before it contains blood, and long before any nerves have been developed in it—when, indeed, it is nothing but a mass of cells!* What is the essential nature of these cells? Does each one possess the property of spontaneous movement? Do we know the nature of the stimuli which cause this movement? And when does this movement begin?

WHEN DOES THE HEART BEGIN TO BEAT?

In discussing this question, a certain eloquent writer says: "The essential unity of the rhythmic beat of the heart, and the amœboid movement of protoplasm, are well shown by the history of the new-born heart. In the chick growing within the egg the heart begins to beat very early, while as yet it is built up of nothing but protoplasmic cells. Many authors, over-jealous, as it seems to me, for the prerogative of nerve-cells, find satisfaction in affirming that these constituent cells of the young heart, though apparently alike in structure, are various, some being potentially nerve-cells, others potentially muscle. To my mind, each and every cell is not only potentially, but actually, both nerve and muscle. So long as they are still cells, that is, still tiny masses of untransformed protoplasm, each enjoys all the powers of life. What befalls them afterwards is not gain, but limitation and loss. Some cells lose the power to move, and so become nerve-cells; other cells lose (to a great extent, at least) the power to originate impulses, and so become muscular. Very interesting is it to watch how the slow, irregular, drawling movements of the primordial protoplasm are gradually transformed and gathered up into the sharp, short stroke of the heart's beat. We speak, in common language, of the heart of the chick as beginning to beat on the second or third day of incubation. It is then that its beat becomes obvious to our senses as a beat. But, in reality, it never does begin to beat. There is no sharp line of demarcation between the protoplasmic crawl and the true rhythmic spasm; the one, little by little, merges into the other. To borrow an illustration from music, it might naturally be imagined that the matter took place in this wise: We might fancy that the tiny cells were marshalled in their places round the cavity of the heart, as musicians are marshalled in an orchestra, fully equipped with powers of rhythmic pulsation, but quiet and inactive; and then, that at a wave of the wand of the great conductor, at the moment when fuller life was breathed into every cell, all struck up in unison with the heart-beat. We might fancy, I say, that this was how the first stroke was wrought. But it is not so. To gain a truer image of the process, we must think of ourselves as listening with eagerness, a long way off, to a multitude of performers assembling together, each playing on the same instrument, but playing in a different way, though all trying to learn the same tune, and all gradually drawing near to us. As we listen to them with stretched ear, coming nearer and nearer, and as, at each moment, more and more performers fall into the one proper time, the initial discordant noise, as it gathers in intensity, also gradually puts on a definite form, and at last there comes a moment when we say, 'Now I hear them! now I have the tune!' So it is with the growing heart. Looking at it earnestly with the microscope, we may fancy ourselves witnesses of how the cells, as they assemble together, little by little exchange the all-sided flow of protoplasm for the limited throb of a muscular contraction, gaining in force what they lose in form. And so there will come a time when we can say, 'Now I can see it beat;' though in reality it has been beating a long time before." *

PATHOLOGICAL DEDUCTIONS.

From a pathological point of view, this peculiar nervous structure of the heart is important. It teaches us that certain diseases of the heart may originate within itself—*i. e.*, are *idiopathic*. Especially may this be the case with the disorders known as functional or nervous. Thus, in some cases the functions of the body may be perfectly healthy, while the heart is disordered. *Its* nervous system may be deranged, while that of the body may be in perfect health.

We are also taught, by the fact of the heart's peculiar irritability, that we cannot always decide on the existence of life or death from the presence or subsidence of its movements. The heart may be still beating in the body while the body has been dead for hours; and the heart may cease to beat while the body lives. The hearts of decapitated criminals have been observed to beat two, four, and even seven and twenty hours after the operation! On the other hand, many instances have been known where the heart's action could not be discovered for hours, yet the patients recovered. In those morbid conditions known as trance and catalepsy, the heart's action may appear to be suspended for hours, days, and even weeks—the patient meanwhile retaining consciousness. In this condition of apparent death many persons have been buried, and some remarkable cases of burial and resuscitation are on record. In syncope or fainting the consciousness is lost, no action in the heart can be perceived, even by auscultation, for many minutes, yet by the proper use of stimuli the patients recover. M. Bouchat says if the heart's action ceases beyond five minutes death is certain, and he declares that the circulation can be *heard*, when it can be detected by no other means, but this assertion is open to much doubt.

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* Dr. S. Foster—"Wonders of the Heart."

But aside from this self-life which the heart possesses, it has a life imparted to it from the brain and spinal cord. The heart receives nerves from the cerebro-spinal system, and also from the sympathetic. From the former it is supplied by the cardiac branches of the pneumogastrics and the lately-discovered motor and sensory nerves, which go to the heart directly from the spinal cord; but the pneumogastrics may be severed at their origin, and the heart continue to act; and, what is more astonishing, the cerebro-spinal centres may be removed from an animal without arresting the heart's action. In those monstrosities sometimes called into being, no brain or spinal cord exists, but they nevertheless possess a regularly pulsating heart. The heart may be isolated from all connection with the sympathetic system, and yet continue to pulsate.

These are important facts for you to remember, in connection with the use of the medicines for the relief of cardiac diseases. A remedy may act upon the cerebro-spinal or the sympathetic systems; but if these systems refuse to respond to the medicinal stimuli, the heart will not feel the action of the curative agent. On the other hand, a remedy may act on the heart, even if the nerves leading from the great centres of the two systems are severed or paralyzed, for it may act by being carried in the blood directly to the heart, there to act upon the ganglia which lie in its structure.

THE PHYSICAL POWER OF THE HEART.

Another wonderful thing about the heart is its immense physical power. It is built up of muscular fibres in such a way as to give it a strength possessed by few other muscular structures. Every time it pumps blood into the arteries it exerts a force which is estimated at *thirteen pounds.* The usual force constantly exerted by the healthy human heart, it is estimated, would sustain a column of blood 7½ feet high, the weight of which would be about 4lbs. 6oz. Imagine, if you will, an organ exerting this immense force — hour after hour — day after day — year after year — and you can form some idea of the aggregate power of the heart during the life of a man. Not only is the power of the heart wonderful, but its sensitiveness is peculiar and unparalleled. As the blood courses through its substance, even into its innermost recesses, it feels the presence, in some way or other, of everything which has found its way into the blood. All poisons, the elements of maladies, the essential portions of all nutritive material, and even the emotions of the mind, influence the heart's motion, and the beat is altered by such influences. Disease may accelerate its pulsations to 140 or 150 per minute, or cause them to sink as low as 25 or 30. So is it with certain medicinal agents. By this use we can alter the heart's force, the frequency of its beats, its regularity of rhythm, and other qualities.

The heart is influenced by all the forces in nature; by all mental and physical influences. "Hence, also, it is that it never wearies. Let me remind you of the work done by our hearts in a day. A man's total outward work, his whole effect upon the world in twenty-four hours, has been reckoned at about three hundred and fifty foot-tons. That may be taken as a good 'hard day's work.' During the same time, the heart has been working at the rate of one hundred and twenty foot-tons. That is to say, if all the pulses of a day and night could be concentrated and welded into one great throb, that throb would be enough to throw a ton of iron one hundred and twenty feet into the air. And yet the heart is never weary. Many of us are tired after but feeble labors; few of us can hold a poker out at arm's length without, after a few minutes, dropping it. But a healthy heart, and many an unsound heart too—though sometimes you can tell in the evening, by its stroke, that it has been vexed during the day, that it has been thrown off its balance by the turmoils and worries of life—goes on beating through the night while we are asleep, and, when we awake in the morning, we find it at work, fresh as if it had only just begun to beat. It does this because upon each stroke of work there follows a period, a brief but a real period, of rest, because the next stroke which comes is but the natural sequence of that rest, and made to match it; because, in fact, each beat is, in force, in scope, in character, in everything, the simple expression of the heart's own energy and state." *

We will now consider the heart psychologically, or the

RELATIONS BETWEEN THE MIND AND THE HEART.

The heart is one of the so-called involuntary muscles, an organ which is supposed to be beyond the influence of the *will*, if not of the mental sphere. But this view of the nature of the heart's relation to the mind is not entirely correct, for, as Dr. Holland has remarked, "the action of the heart is often quickened, or otherwise disturbed, by the mere centreing the consciousness upon it, without any emotion or anxiety. On occasions where the beats are audible, observation will give proofs of this, or the physician can very often infer it while feeling the pulse, and when there is liability to irregular pulsation, such action is seemingly brought on, or increased, by the effort of attention, even though no obvious emotion is present."

Dr. Murray, writing of "Emotional Disorders," says, "The heart is an organ highly susceptible of emotional excitement, and even the strongest *volition* and coolest temperament will not give immunity from this susceptibility. Thus easily excited, in those of nervous temperament the organ is ever been disturbed by emotion. Note, for instance, the palpitation or paralysis of fear, and the intermittent action of a weak or unhealthy organ when it is under the influence of emotional excitement. Further, we have more than once noticed, that long-continued anxiety will lead to a weak and slow action of the heart, causing the pulse at the wrist to fall below its normal standard, both in frequency and force, and at the same time rendering the organ liable to become excited and turbulent on the slightest accession of new emotional feelings."

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* "Wonders of the Heart," by Stephen Foster.

Indeed, such is the influence of emotions on the heart, that a sudden and painful shock to the feelings has been known to arrest its action, or to excite it to an action so turbulent as to injure its valves or their tendinous cords. The phrase "died of a broken heart" is is not purely figurative, for the heart has been *ruptured* by violent emotions, resulting in sudden death.

Terror may paralyze the heart, and so may joy when it suddenly seizes upon a person already overpowered by despair. The Roman matrons, after the battle of Cannæ, on seeing their sons, whom they supposed to have been killed, dropped down dead on the spot. *Fear*, the chronic form of fright, occasions a tremulous palpitation, not the full, bounding beat of energy or courage. *Rage* produces præcordial oppression, and has been known to bring on an attack of angina pectoris. I have known excessive grief, from disappointed affection, to cause not only functional disorder, with irregular and feeble pulse, but those abnormal sounds in the heart which indicate deranged action of its valves, while, at the same time, the patient grew pale and anæmic. As a rule, hope will excite and sustain the organ; despair and anxiety will depress it; and contentment and peace of mind will give it healthy action.

It is my conviction that but few physicians have realized the importance of the subtle relations of the brain or mind and the heart; or appreciate the connection between the soul and that centre of physical life. We might go so far as to assert, that as there is a corporeal heart, which is the life-giving centre of the body, so there must be a spiritual heart, which is the centre of soul-life. Else, why do we continually use the word "heart," as applied to the feelings, impulses, and emotions? We say, a man "has a heart," or "no heart," that such an emotion "comes from the heart," or "comes from the head," indicating thereby that one kind of feeling or impulse may be from the soul, and another from a more "calculating" origin. All the grand, noble, loving, and impassioned impulses of our nature are said to come from the "heart;" while the cold, unemotional, and more practical acts are said to emanate from the brain. As a rule, what is deeply rooted in the natural convictions and expressions of the people, has its origin in truth, and so is this accepted correspondence between the feelings and the passions of the soul, and the physical heart, based upon a correspondence between the heart, which is the central life of the body, and love, which is the central life of the soul.

But the *will*, as well as the emotions, may affect the heart. Many cases illustrative of this assertion are on record. The best authenticated case is that of a Col. Townsend, of Baltimore, which was described by Dr. George Cheyne, who was a witness of the fact. The case was that of a gentleman in apparent health, who by an effort of the *will* could at any time cause an *apparent* cessation of all the vital functions, so that the *heart's action could not be perceived*, nor any respiratory movements be observed.

It is a fact well known to anatomists, that animals possess the power to move and govern certain muscular organs and muscles, while man, possessing the same muscular structures, has no apparent influence on them. How far this influence extends to the heart is a problem which may well attract our attention. We should not overlook this sympathy between the mind and the heart. A full appreciation of it may lead us to form opinions and diagnoses, which could not otherwise be correctly made. A physician may be treating the heart with medicines, when his efforts *should* be directed to a "mind diseased." We should never lose sight of the psychological relations of the heart, as well as its anatomical, physiological, and pathological history.

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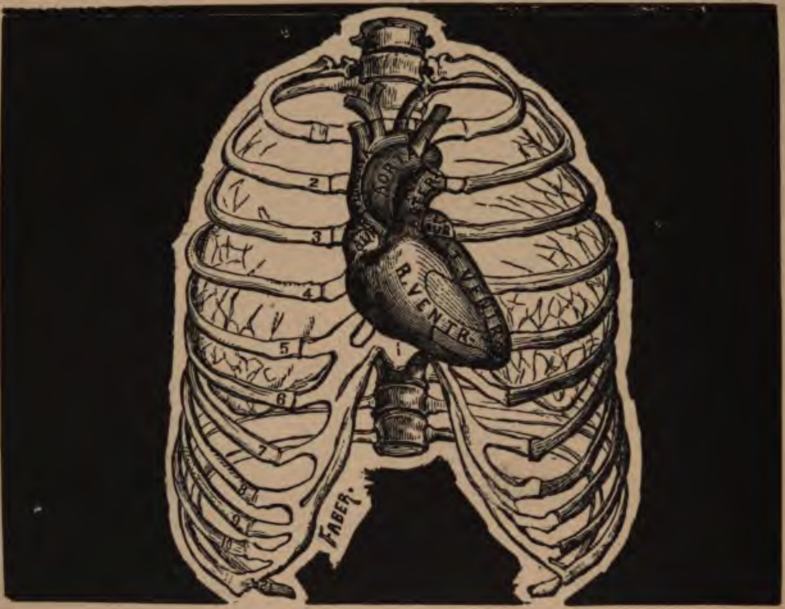
* Treatise on Nervous Diseases, p. 307.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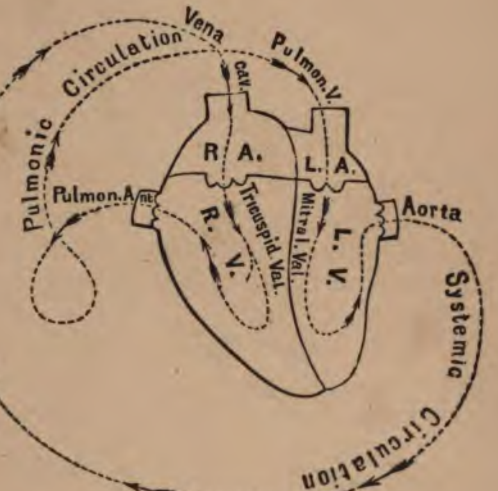
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R. A.
L. A.
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Tricuspid.Val.
Mitral.Val.
R. V.
L. V.
Aorta
Systemic Circulation

LECTURE II.

Circulation of Blood through the Heart—Location of the Heart—Space over which Normal Dullness is found—Sounds of the Normal Heart—Sounds of the Abnormal Heart.

GENTLEMEN: Before I proceed to describe the Diseases of the Heart, it is proper that we inquire into the method of the circulation of the blood in and through that organ.

The *venous* blood which is returned by the ascending and descending vena cava, enters the *right* auricle during its diastole.

Part of it flows on into the right ventricle during the earlier part of its diastole; but the auricle being filled before the ventricle, then contracts, and discharges its contents through the *tricuspid valves* into the ventricle, which it thus completely distends.

The reflux of blood into the veins during the auricular systole, is impeded by the contraction of their own walls, and by the valves with which they are furnished; but these valves are so formed as not to close accurately, especially when the tubes are distended; so that a small amount of reflux usually takes place, and this is much increased when there is any obstruction to the pulmonary circulation.

Whilst the *right* ventricle is contracting upon the blood that has entered it, the *carneæ columnæ*, which contract simultaneously with its proper walls, put the *chordæ tendinæ* upon the stretch, and these draw the flaps of the *tricuspid valve* into the auriculo-ventricular axis.

The blood then getting behind them, and then being com-pressed by the contraction of the ventricle, forces the flaps together in such a manner as to close the orifice; but they do not fall suddenly against each other, as is the case with the semi-lunar valves, since they are restrained by the chordæ tendinæ, whence it is that no sound is produced by their closure.

The blood is expelled by the ventricular systole into the pulmonary artery, which it distends, passing freely through its *semi-lunar valves;* but as soon as the *vis a tergo* ceases, a reflux might take place by the contraction of the arterial walls. The valves are filled out by the backward tendency of the blood, and completely check the return of any portion of it into the ventricle.

The blood after having circulated through the lungs, returns as arterial blood by the *pulmonary veins* to the *left* auricle; whence it passes through the *mitral* valve into the left ventricle, and thence into the *aorta* through its semi-lunar valves, in the same manner with that on the other side.

We will now proceed to describe and determine the

LOCATION OF THE HEART,

and *the space in which normal dulness is found.*

The heart is situated between the cartilages of the third and sixth ribs. The upper extremity, or base, is defined with sufficient precision by the upper margin of the third rib. The point or apex generally extends to the fifth intercostal space, near the junction of the ribs to its cartilage. The organ is situated obliquely within the chest, a line passing through the longitudinal axis, intersects obliquely the clavicle near its acromial extremity. The medial line and the linea mammalis, are convenient landmarks for indicating the space which the heart occupies transversely. The median line divides the heart, leaving about one-third on the right, and two-thirds on the left side. The left margin of the heart, in the male, extends to a point just within the nipple, which is situated on the fourth rib, near the junction of its rib with the cartilage. The apex is about three inches to the left of the median line, and about an inch within the linea mammalis. The right margin extends from half an inch to an inch beyond the sternum, on the right side.

Viewing the several portions of the heart in relation to the median line, on the right are situated the right auricle, and about a third of the right ventricle; on the left of this line are situated two-thirds of the right ventricle and the left auricle.

The relations of the heart to the adjacent organs are important with reference to the signs furnished by percussion, also by the other methods of explorations. At the base are the large arteries connected with the ventricles, viz., the aorta and pulmonary artery, which extends up beneath the sternum—the latter to the level of the upper margin of the second, and the former nearly as high as the first rib. The portion of the heart situated on the *right* of the median line is *covered* by the right lung. The lower border of the heart, to the left of the median line, lies on the diaphragm which separates it from the left lobe of the liver, and, towards the apex, from the stomach. The portion of the heart lying to the *left* of the median line, is only partially covered by the left lung—a part is in contact (the pericardium only intervening) with the thoracic walls.

The space on the chest within which the heart is not covered by lung, is called the *superficial cardiac region.*

The præcordial space within which the heart is covered by the lung, is called the *deep cardiac region.*

These names should be remembered, for they will frequently occur.

The boundaries of the *superficial cardiac region* are thus given: It is bounded on its sides by lung, and on the greater part of one side, viz., the lower, by the liver and stomach, with the diaphragm intervening. The portion of the heart's surface exposed, is an irregular quadrangle. This space may be embraced within a right angled triangle delineated as follows: The oblique line, or hypothenuse, is drawn by connecting a point at the centre of the sternum on a level with the junction of the fourth costal cartilage, with the point where the apex of the heart comes in contact with the thoracic walls, the latter being usually in the fifth intercostal space, about an inch within the linea mammalis, or about three inches to the left of the median line. The median line extending from the same point on the sternum, and a line extending transversely from the point of the apex-beat to meet the median line, will form the two other sides of the triangle.

The limits to which the *deep cardaic region* extends have been already defined in giving the boundaries of the space which the heart occupies within the chest.

The dulness over the *superficial cardaic region* is more decided than over the *deep-seated cardaic region*, owing to the fact that it is not covered by lung. This dulness can be recognized by *light* percussion. It requires *forcible* percussion to mark out the dulness over the *deep cardaic region.*

[For full and minute directions to examine by percussion, consult Walshe or Flint on Diseases of the Heart.]

If the *dulness*, found on examination of a patient, exceeds the limits given above, we may conclude that some kind of enlargement exists. The heart, in proportion to its increase in volume, pushes aside the anterior border of the left lung, leaving a large portion of its anterior surface uncovered and in contact with the thoracic walls. The degree of dulness within the superficial cardaic region is greater than in health in proportion to the enlargement. Increased extent and degree of superficial dulness are signs of enlargement of the heart, provided the adjacent organs are healthy. The presence of phthisis, chronic pleurisy, enlargement of the liver, dilatation of the stomach, aneurism of the aorta, enlarged spleen, ascites, pregnancy, may cause difficulty in making a correct diagnosis by means of percussion.

The limits of this work will not permit us to go further into this subject. For full and exact knowledge relating to the physical diagnosis of abnormal conditions discernable by percussion, reference must be had to the works previously alluded to.

THE SOUNDS OF THE NORMAL HEART.

When the ear is applied over the cardaic region, during the natural movements of the heart, two successive sounds are heard, each pair of which corresponds with one pulsation; there is also an interval of silence between each recurrence, and the sound that immediately follows this interval is known as the *first* sound, the other as the *second.*

The *first* sound of the heart is caused by the dilation or *diastole* of the ventricles, and is called the *diastolic* sound. The *second* sound is caused by the contraction or *systole* of the ventrioles, and is called the *systolic* sound.

The *first* sound is heard plain, over the *apex* of the heart, or where the apex-beat is felt.

The *second* sound is best heard just above the base of the heart, in the intercostal space between the second and third ribs, close to the sternum.

The *first* sound, over the apex, is longer, lower, and has a "blowing" quality.

The *second* sound, in the second intercostal space on either side, is shorter, more acute, and has a clicking or valvular quality.

In order to get a clear idea of the heart-sounds, the stethescope should be used. The bin-aural stethescope is considered superior to all others for this purpose.

If the *ear* is applied to the præcordia, the sounds from different sources are commingled, and they cannot be so well studied separately.

The *second* sound of the heart varies, as we study it on different sides of the sternum, in the space between the second and third ribs.

On the *right* side the sound is more acute, more abrupt, louder, and apparently nearer the ear, and is said to be caused by the movements of the semi-lunar valves of the *aorta.*

On the *left* side the sound is less acute, and emanates from the valves of the pulmonary artery, and due to their expansion succeeding the ventricular systole.

This *second* sound of the heart consists of a single element only — a *valvular* element — in this respect differing from the first sound.

The *first* sound of the heart, as heard over the apex of the organ, is a *mixed* sound. It is composed chiefly of two distinct elements. One of these elements consists of a clicking sound, emanating from the mitral and tricuspid valves; the other proceeds from the movements of the apex of the heart against the thoracic walls. The latter is called the element of impulse, or the impulse-sound; the former, the valvular element, or valvular sound.

THE ABNORMAL SOUNDS OF THE HEART.

There are certain morbid sounds or murmurs of the heart which occur in disordered conditions of that organ. They mingle with, follow, or quite supersede the healthy sounds.

These "murmurs," as they are generally called, with one or two exceptions may be considered as modifications of the *bellows murmur*, or *bruit de souffle.*

This, in its purest form, is a smooth, blowing sound, named from its resemblance to that made by a pair of bellows. It may be single or double, soft or loud, of a low or high key; short, so as to merely prolong one of the natural sounds, or continuous, so as to fill up more or less completely the space between the impulses. Sometimes it wholly supersedes the healthy sound, and nothing is heard but one continuous bellows-murmur; but such cases are rare.

Not unfrequently it becomes, in various degrees, rough or broken; and attempts have been made to designate the modifications thus produced by the terms filing, rasping, sawing, etc. The *sawing* sound being a *double* sound, should only be applied to the double murmurs produced by the alternate motion of the heart. In some instances the murmur is of a musical or whistling character, and has been compared to the chirping of young birds.

The pure *bellows murmur* may exist without any organic disease of the heart. It may be produced artificially, by alterations in the diameter of one of the larger arteries, even in health, as by the pressure of the stethescope upon the artery. The most frequent cause of the sound is probably an abrupt contraction at one of the orifices, or in one of the tubes through which the blood passes. It will be readily understood that the fluid, as it emerges from the stricture, and spreads out to fill the larger space beyond it, breaks into currents, which set against the sides of the tube, and, being thence reflected, occasion vibrations which result in sound. Thus the sound may result from contraction of any of the orifices of the heart, or the expansion of one of the great arteries immediately beyond them, and, in the former case, may be produced either by organic or by functional disease or spasmodic contraction. The *bellows murmur* is not always produced by changes in the heart and arteries. It may be produced by a *watery state of the blood*, such as occurs in chlorosis or anæmia. The liquid in these states being more movable, currents are more easily formed by whatever affects the regular movements of the blood. In such conditions, anything which excites the circulation will generate the murmur. It may also be induced by bleeding, and arises from any profuse hæmorrhage.

The *rough murmurs*, as they are called, to distinguish them from *smooth* murmurs, may be produced by *inequalities* in the surface over which the blood flows, especially in the orifices of the great vessels, produced by depositions of lymph, excrescences of various kinds, osseous or cartilagenous productions, etc. These rough sounds, like *rasping*, *filing*, and the like, are supposed to indicate organic disease in the valves or the valvular openings.

Another species of murmur is called the *regurgitant*. These regurgitant murmurs are caused by some defect in the valves—either loss of substance, irregular thickening, dilatation of the orifice, or something else which prevents their accurate closure, and thus allows a regurgitation of the blood. It may be supposed that in these cases the sound is ascribable not only to the irregularity given to its backward movement through the insufficient valve, but also in some measure to the conflict of the reverted with the regular current of blood; as, for example, when the blood of the contracting ventricle is sent through the insufficient auriculo ventricular valve against the current entering the auricle.

All these murmurs are heard most distinctly when the heart is in an excited condition. They are influenced by the less or greater force of the moving cause. The *systolic* ventricular murmurs are louder than the diastolic, because the former is caused by the more powerful contraction of the ventricles; the latter, on the feebler elastic pressure of the great arteries.

Roughness of sound is proportionate to irregularity in the surface producing it, and it most frequently attends regurgitation.

The *tone* of the murmur depends somewhat on the depth at which the sound is generated.

By close examination, the following two important points can be ascertained:

I. *In which of the valvular orifices the murmur originated.*

II. *Whether it depends on obstructions, or upon deficiency of the valves, and consequent regurgitation.*

When the sound is loudest on the sternum immediately below the insertion of the third rib, and thence extends upwards for about two inches along the course of the great vessels, it may be considered as having its source in the *semi-lunar* valves.

If the sound be perceived most distinctly along the course of the ascending aorta, upon the right, it is probably seated in the *aortic* valves; if along the pulmonary artery, on the left, it is in the *pulmonic* valves.

When the murmur is most distinct over that part of the chest on which percussion is dull—that is, where the ventricles are in contact with the walls—it may be inferred that it is generated either in the *mitral* or *tricuspid* valve; in the former, when the point of greatest loudness is a little to the right of the left nipple, and an inch or so below it; in the latter, when the analagous point is on or near the sternum, in the same horizontal line.

There are other *morbid sounds*, resembling murmurs, which have nothing to do with the valves of the heart.

Among these are the *anæmic murmurs*, mentioned above. They do not follow the course of the large vessels so fully or frequently as do valvular murmurs. They occur only during the systole of the ventricles—are not generally heard below the left nipple, as they do not arise from regurgitation through the mitral valve. They are almost always accompanied by a smart, smacking impulse. They disappear during mental or physical quiet. They are always diminished, and generally disappear under appropriate medical treatment, which is not ordinarily the case with true valvular murmurs.

Venous murmurs (nun's murmur, top murmur,) are heard in many young persons, in the anterior triangular space, in which the external jugular vein descends. It is a continuous murmur, and is generally more audible on the right than on the left side. This murmur disappears when the current of blood is interrupted by pressure upon the jugular vein, or by any position of the body in which the head lies lower than the thorax. It is heard loudest in an erect position, and during inspiration. It was thought to be connected with anæmia, but has been found as often in young and healthy persons.

Pericardial murmurs. The inner surface of the pericardium is normally smooth, and the heart moves within it without causing any sound. But when this surface becomes roughened in consequence of inflammation and exudation, we hear *friction-sound*, which may closely resemble an endocardial murmur. We can generally distinguish between these murmurs, for the *internal* murmurs correspond almost exactly to the rhythm and the natural sounds of the heart, whilst the *friction-sounds* seem to *follow* upon the movements of the heart. Should the friction-sound be short, we cannot distinguish it from an endocardial murmur.

There is another *friction-sound*, caused by a roughened condition of that portion of the *pleura* which covers the unattached portion of the pericardium. It is produced by the rubbing of this portion of the pleura against the lungs or thoracic walls. Being caused by the action of the heart, it exactly coincides with its rhythm, and cannot be distinguished from endocardial murmurs. The previous history of the disease and the result of appropriate treatment can only settle the question.

LECTURE III.

FUNCTIONAL DISORDERS OF THE HEART.

Definition and various Forms of Disorder — Pathological Relations and Causes — Association with other Diseases — Symptoms, Physical Signs of — Diagnosis — Prognosis — Treatment — Cases.

GENTLEMEN: I propose to take up the Diseases of the Heart in the following order: (1) Functional. (2) Inflammatory. (3) Organic. This lecture will treat of *Functional Disorders of the Heart.*

A purely functional disorder of the heart is any disturbed action occurring independently of either inflammatory or organic affection. These affections may be attended by more or less functional disorder, but there are many cases where the latter are unattended by any lesion or inflammation.

In most cases, the disturbed action of the heart is evidently due to morbid conditions seated elsewhere, but it may be symptomatic of either blood-changes, or affections of the nervous system, or of both.

It must be borne in mind that disordered function of the heart, in cases of inflammatory or organic affections, involves the same morbid conditions which often exist independently of these affections.

The subject of functional disorder of the heart is of great practical importance, on account of the frequency of its occurrence, the anxiety which it occasions, and the liability of confounding it with organic disease.

The majority of persons who complain of symptoms referable to the heart, suffer from functional disease only. But the discrimination of functional from organic affections can only be made by one who is thoroughly acquainted with the subject. The great importance of a correct diagnosis is obvious, when we consider that structural lesions involve more or less danger, while functional disorder, although very distressing, very rarely, if ever, proves serious.

There are several varieties of functional disorder. In the mildest form the action of the heart is simply increased by transient exciting causes, such as mental emotions, unusual exertions, etc., but this excited action is only transient.

Persisting inordinate action is another form. The heart may act with regular rhythm, but with abnormal rapidity and force, not greatly influenced by exciting causes; and this action may continue for weeks and months. The pulse, in such cases, ranges from 120 to 130 per minute, and the patient is in a state of constant anxiety, fearing organic heart disease.

Paroxysms of irregular and tumultuous action is another form of this disorder. Such paroxysms often occur without any obvious exciting cause, and the patient is attacked suddenly with violent beating of the heart, with disturbed rhythm. A feeling of impending death is experienced, with great terror and anxiety, which increases the intensity of the paroxysm. The slightest motion increases the anxiety and palpitation. (*Digitalis.*)

The attacks may occur at short intervals, or only once in a few weeks; they may last but a few moments, or several hours. Such cases are frequently met with in hysterical women, and are accompanied by various attendant symptoms. Boullard calls this affection an "insanity of the heart," but it has appeared to me to act more like a choreic affection, such as we observe in muscles elsewhere.

Another species of paroxysm is *irregularity* and *intermissions, without increased force of the heart's action;* on the contrary, the action of the heart may be quite feeble. Such paroxysms inspire great terror. The patient feels as if the slightest movement would cause death, from stoppage of the heart's motion, or from syncope. (*Gelseminum.*)

It must be remembered that some cases of mere *intermittency* are congenital, and are of no importance as a symptom.

In other cases the pulse may intermit, but not the heart's action. This is termed a false intermission. The force of the ventricular contraction is not sufficient to produce a radical pulsation.

CAUSES AND PATHOLOGICAL RELATIONS OF FUNCTIONAL DISORDER OF THE HEART.

These may be enumerated as follows: plethora, anæmia, derangement of the nervous system, dyspepsia, and the gouty diathesis.

Plethora is that condition in which the blood is abnormally rich in red globules, and, perhaps, in excess as regards quantity. The heart becomes overtaxed and overstimulated, and becomes morbidly irritable. There is much violence of action without much disturbance of rythm. Palpitation may be the first symptom that awakens the anxiety of the patient, and concentrates his attention on the heart. He becomes fearful of organic disease, and taxes the patience of his medical attendant to a high degree. Those who suffer most from this affection are men who leave the farm or workshop, and men of previously active business pursuits, who change their mode of life and become luxurious, indolent, or lead sedentary lives. Women who tend to obesity and live much indoors are liable to this form of heart disorder.

Anæmia, or an opposite condition to the above, is more frequently met with, and rarely occurs without more or less disturbance of the heart's action. Women are more subject to this variety than men. Anæmia being produced by excessive loss of blood, or of any of the fluids of the body, the first cause may generally be located in some particular organ or tissue. It must be borne in mind that the heart disorder is not always proportionate to the anæmia. It may be slight in cases of marked anæmia, and severe when that condition is hardly appreciable.

With the anæmia, besides the functional heart disorder, we shall find coldness of the extremities, headache, neuralgia, melancholy, irritability of temper, etc. Anæmic patients, with heart symptoms, live in constant dread of organic disease, and fear of fatal results. If the physician trusts altogether to symptomatic phenomena, he may have the same fear of serious results in his patient, for in these cases palpitation is excited by the slightest exertion; dyspnœa is experienced, the countenance is morbid, and occasionally dropsy sets in, which may be mistaken for the dropsy caused by organic disease.

Derangements of the nervous system may be a cause of functional disorder of the heart, without the presence of anæmia. Cases of hysterical palpitation come under this head, for hysteria often occurs without anæmia, but with plethora.

A condition of the nervous system favorable to functional disorder is said to be caused by masturbation and venereal excesses. Uterine disorders are a prolific cause. The excessive use of tobacco, green tea, and coffee often induce a condition giving rise to functional disorder of the heart.

Whatever may be the causes of this condition, mental depression is a constant attendant (in marked contrast to chronic pulmonary affection). The patient persists in believing that he has organic disease, in spite of our most earnest assurances. He watches the action of the heart with constant anxiety, and habitually counts his pulse, and feels for the beating of the heart, and lives in such a morbid state, mentally, that the condition of the heart is actually aggravated by his constant dread and apprehension.

Dyspepsia, in its various forms, tends directly to cause this disorder, but as many dyspeptic ailments proceed from derangement of the nervous system—and this often induced by mental distress or anxiety—it is often difficult to separate this cause from those gastric affections proceeding from indigestion or hepatic derangement.

Dyspeptic patients with heart disorder are equally prone to magnify it into a dangerous complaint. They watch the pulse and the beating of the heart, and are in dread of sudden death, such as they have heard of in organic disease. It is notorious that this morbid watching for heart-symptoms, and the anxious expectations of finding heart disease, is actually sufficient, in some cases, to produce the functional variety. The presence of gas in the stomach, even when dyspeptic symptoms are not present, often causes severe attacks of palpitation. In such cases, the expulsion of a quantity of wind by belching often puts an end to the distressing paroxysm.

The gouty diathesis gives a liability to functional derangement of the heart's action. Attacks of palpitation occur in such persons before the joints are affected, and cease when tumefaction is present. The presence of an undue quantity of *lithic acid* in the blood is supposed to be a cause—acting as an irritant to the nerves which control cardiac action.

Other causes of functional disorders have been noticed by clinical observers. It occurs during convalescence from fevers. Deformities of the chest seem to favor it. Young persons whose growth is rapid are liable to it. Excess in muscular exercise induces it. Soldiers in the late civil war were affected with it, probably caused by the excitement and muscular exhaustion incident to their life.

FROM WHENCE COMES CARDIAC INNERVATION?

This is an interesting question, both in its pathological and therapeutic relations. Barthez* says we must make a distinction between the *radical* and the *acting* forces governing the heart. The former may be nearly exhausted, while the latter are in full play; and, *vice versa*, the latter may be but slightly manifested, while the former are powerful. The amount of *radical* forces represents a person's capacity of vital resistance to disease and fatigue. The *acting* forces have their origin in the radical. In cases of functional disorder we have hyperæsthesia from debility, or a *morbid* stimulus may be reflected from the nervous centres on the cardiac nerves.

According to Bezold, the nervous centre of the cardiac movements furnishing three-fourths of the entire propulsive power of the heart, occupies the *cervical region of the cord, including the medulla oblongata, and extends as low as the fourth dorsal vertebra.* Its fibres run through the cervical spinal cord, and pass out between the seventh cervical and fifth dorsal vertebra, probably passing through the lower cervical and upper dorsal sympathetic ganglia, and proceeding to the heart.

The innervation of the heart is derived, in part, from the ganglionic or sympathetic system, and partly from the pneumogastric nerves. For its *active force* the heart is dependent on the cardiac ganglions and the plexus of nerves with which they are connected. The function of the pneumogastrics is to *regulate its action.* The latter presides especially over the rhythm of the heart's movements. Morbific agencies giving rise to functional disorder may affect separately these two sources of the innervation of the heart. Most of the causes of functional disorder probably act primarily upon the nervous centres, but in some cases, as when the disorder depends on dyspepsia, or uterine irritation, the morbid influence is transmitted to the nervous centre, and *reflected* upon the heart. Very many cases of functional disorder of the heart are doubtless reflex in character. If we could decide, by accurate investigation, the particular nerves upon which medicines act pathogenetically, our knowledge of the curative powers of remedies would be much more certain.

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* Traits de Therapeut., vol. 1, p. 43, par Trousseau and Pidoux.

PHYSICAL SIGNS OF FUNCTIONAL DISORDER.

Physical exploration by means of auscultation, percussion, and palpation, is of immense value in functional disorder of the heart, as showing the *absence* of the signs of inflammatory and organic affections. The information which it affords is not less positive than if there were certain signs peculiar to functional disorder.

In our examination of the heart in cases of supposed functional disorder, we have to decide, *first*, as to the absence of abnormal phenomena denoting structural changes; and *second*, as to the presence of the normal phenomena denoting soundness of the organ.

By *percussion* we can ascertain that the heart is not enlarged, and, if not enlarged, that the disorder is quite certain to be functional. But we cannot, on the other hand, decide that the disorder is *not* functional because the heart *is* enlarged, for functional disorder may supervene upon, or coincide with enlargement.

Palpation enables us to ascertain the *force* of the heart's action. The movements and the irregular action are readily appreciated by the hand. We can discriminate between the *increased* and disturbed action due to morbid excitement, and the augmented *power* due to hypertrophy. The impulse in hypertrophy denotes *strength* rather than *force*; it is not quick and violent, but sluggish and strong; it does not give the sensation of a shock or blow, but it causes a gradual and strong heaving of the præcordia.

Palpation also shows that in functional disorder not attended by structural disease, the point of apex-beat is in its normal situation; not elevated, as in pericarditis with effusion, nor lowered and carried to the left, as in cases of enlargement of the left ventricle.

Auscultation is important in two ways, *first*, by showing the *absence* of abnormal sounds indicating valvular lesions; *second*, showing that the natural sounds preserve their essential characters and normal relations to each other.

Endocordial murmurs are very rarely heard, if ever, in purely functional disorder. A venous murmur, or hum, in the veins of the neck may be heard in persons in health, and the anæmic murmur may be diagnosed by the general condition of the patient. Aside from these two murmurs, it is not of practical importance whether a murmur be organic or inorganic, so far as relates to the treatment of functional disorder. Valvular lesions do not cause notable disturbance of the heart's action prior to enlargement. If therefore enlargement is not present, the disturbed action of the heart may be considered as functional.

It must be borne in mind that all the normal heart sounds are intensified by the increased action present in functional disorder. So distinct do they become, that they may be perceived by the patient, especially at night. But if their sounds are only intensified, and not changed, we may know that functional disorder only exists.

DIAGNOSIS.

In order to make a correct diagnosis, we must *first* determine whether organic disease be or be not present; *second*, if organic disease be present, to determine whether superadded functional disorder be not the source of more or less of the symptoms referable to the heart.

It is in this case as in tubercular phthisis, that we can sometimes decide from the *mental* condition of the patient.

It is well known that persons affected with tuberculosis are cheerful, and do not appreciate the gravity of the disease, while in those pulmonary disorders not dangerous they are despondent and foreboding.

In functional cardiac disorder, the patient is very anxious and apprehensive, while in purely organic disease no such degree of anxiety is manifested; on the contrary, they are often apathetic on the subject.

Again, the same or a greater amount of disturbance, when present in organic disease of the heart, causes much less anxiety than when arising from functional disorder.

The paroxysmal character of functional disorder is quite in contrast with the continued persistency of the symptoms of organic lesions.

In functional disorder active exercise does not generally aggravate the symptoms, it sometimes alleviates them, while in organic disease the contrary obtains.

There are certain symptomatic conditions belonging especially to organic disease, that are absent in pure functional disorder. Among these are general dropsy, lividity, hæmoptysis, paralysis from embolism. They may coexist with functional disorder, but are not caused by it.

Cardiac disturbance is probably functional if it be connected with plethora, anæmia, derangement of the nervous system from excessive venery, mental anxiety, the abuse of tobacco, tea, coffee, or with gout.

Organic disease, on the other hand, in the majority of cases originates in acute rheumatism. If the patient has never had the latter affection, the probability is that the disorder is functional.

Functional disorder occurs especially in the young, between puberty and middle life.

Organic disease is oftener present in persons past the meridian.

Functional disorder is oftener present in females than males, while the reverse occurs in organic disease.

Functional disorder is worse at night; organic disease during the day.

We should not, however, venture an opinion as to the presence or absence of functional disorder, until we have

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made a physical examination. This, and this only, should decide us in forming a diagnosis.

PROGNOSIS.

The prognosis in cases of uncomplicated functional disorder is always favorable. The opinion that it may lead to organic lesions has been disproved. We may safely assure our patients that if a recovery does not occur, no organic disease need be apprehended.

TREATMENT OF FUNCTIONAL DISORDER OF THE HEART.

The therapeutics of functional disorder of the heart include:

I. Relief of disturbed action when present, or *palliative* measures.

II. Removal of the morbid irritability of the heart, or the causes of such irritability. These are the true *curative* measures

Palliative measures are those which will allay any temporary excitement or disturbed action.

The mildest form of the disorder, when it arises from a fright, or undue exercise, usually need only rest of mind and body to allay it. A single dose of *aconite* may be of service.

For the attacks of palpitation, irregular and intermitting action, weakness or syncope, the following remedies will be found appropriate:

For paroxysms of palpitation from physical excitement, mental emotion, etc., a single dose of *aconite* will suffice if it has been caused by fright; *coffea* if from excessive joy; *ignatia* if from sudden grief; and *scutellaria* if from inordinate excitement of other kinds.

For paroxysms of tumultuous and irregular beating of the heart, with *violent* impulse, the chief remedy is *veratrum viride*, in doses of one drop of the tincture every hour, or oftener; a few doses will quiet the excitement. Such paroxysms usually occur in plethoric subjects. In similar cases *cactus* is often indicated, also *aconite*, *arsenicum*, *belladonna*, *cocculus*, *lachesis*, *naja*, and *spigelia*.

For paroxysms characterized by irregularity and intermissions, with *feeble* action or impulse, another class of remedies is indicated, namely: *digitalis*, *cannabis ind.*, *laurocerasus*, *acidum hydrocyanicum*, *arsenicum*, *veratrum album*, and *aconite*.

Paroxysms of tremulous agitation of the heart call for nearly the same remedies, but the attacks are generally of such brief duration, that there is no time for the administration of medicines.

Hysterical palpitations or disturbed action, require the use of *ambra*, *assafœtida*, *camphor*, *castoreum*, *crocus*, *ignatia*, *lilium*, *sumbul*, *scutellaria*, and *valeriana*.

In actual cardiac syncope, the use of active stimulation is necessary. Brandy, or any alcholic liquor may be used, or *camphor*, *xanthoxyllum*, and *ammonia*, aided by the mustard foot bath. The recumbent posture is absolutely necessary until the attack is over.

[For special or characteristic indications for the selection of remedies consult the symptomatology given in this work.]

RADICAL OR CURATIVE TREATMENT.

Plethora should be treated by means of appropriate diet, namely: the abstinence from rich and stimulating food, coffee, pastry, and the avoidance of a sedentary life. Small meals and a large amount of active exercise are the principal curative agents.

The administration of *veratrum viride* in doses of five drops of the first decimal dilution three times a day, will aid in effecting a removal of the plethoric condition. Equally efficacious is the *bromide of ammonium* in five or ten grain doses of the first decimal trituration, taken after each meal.

Anæmia should be met by such remedies as will increase the proportion of red globules in the blood, and the use of such articles of diet as will bring about the same result. Active exercise in the open air, and a residence in non-malarious localities, should be advised.

Ferrum, in some form, is here the principal remedy; but it must be borne in mind that *iron* is *not* the remedy in all cases of anæmia. It will not remove anæmia caused by distressing emotions, nor the anæmia growing out of some morbid dyscrasia. It is only useful in cases arising from some fault in assimilation or abnormal condition of the vegetative system. Various preparations of *iron* have been found useful. *Ferrum met.* in the lowest triturations is generally useful; but if this does not have the desired result, and *iron* seems to be strongly indicated, select the *lactate of iron*, *muriated tincture of iron*, *phosphate of iron*, *iodide of iron*, or the *citrate of iron and strychnia*.

The hypophosphites of lime, soda, or potassa, phosphoric, or *hypophosphoric acid*, act promptly if the anæmia arise from nervous prostration or prolonged nervous excitement.

China is indispensable if the anæmia is the result of hæmorrhages, or loss of any of the vital secretions of the body. *Helonias*, *hydrastis*, *phosphoric acid*, and *arsenicum* are indicated in similar conditions.

Cuprum is, according to Grauvogl, superior to iron in many cases of anæmia.

Nux vomica, *ignatia*, and *strychnia* are indispensable in certain anæmic conditions, when the blood is impoverished from deficient vitality of the nervous centres.

When derangement of the nervous system causes functional heart-disorder, *nux*, *ignatia*, *secale*, *phosphorus*, *cuprum*, *digitalis*, *phosphoric acid*, and similarly acting medicines are to be used. The *bromide of potassa* and *zinc* will be found useful in many cases.

When the cardiac irritation is *reflex*, we must select:

For *gastric disturbance* — *nux vomica*, *pulsatilla*, *ignatia*, *collinsonia*, *lycopodium*, *iris ver.*, *hydrastis*, etc.

Collinsonia is very highly recommended by many prominent physicians of the eclectic school of medicine, as an excellent remedy in purely functional disorder of the heart, when its action is *persistently rapid*, *but weak*, or when there is excessive *action* with deficient *force*. It has been given successfully in doses of 5 to 15 drops of the tincture several times a day. The pathological conditions to which it is homœopathic cannot be clearly defined because the provings do not yet indicate its specific action on the heart. But from its known curative action in cough, hœmoptysis, hæmorrhoids, and constipation, we may consider its action on the heart as *reflex.* My experience confirms the recommendation of its use in some cases of functional disorder.

For *uterine disturbance—cimicifuga*, *pulsatilla*, *platina*, *lilium*, *sepia*, *gelseminum*, *nux moschata*, *sanguinaria*, etc.

The following is one of the many notable cases of functional disorder of the heart resulting from uterine disease, which have come under my observation:

Case.—A lady, mother of two children, had suffered for several years from retroversion, abrasion of the os uteri, and a great variety of anomalous pelvic pains peculiar to such cases. About a year ago the uterus was replaced, and a ring pessary inserted, which kept the uterus in normal position, and soon after the leucorrhœa and uterine pains disappeared. But she soon began to complain of rapid and persisting beating of the heart—worse at the menstrual period—which increased to such a degree that I was consulted. Neither auscultation nor percussion revealed anything abnormal, except an increased clearness of the sounds of the heart. The force of the heart's action was decidedly increased. The pulse was generally regular—120 to 130—but sometimes irregular and intermitting. The menses, heretofore normal in amount, became scanty, and a condition of prostration set in, accompanied by emaciation. All the cardiac remedies in our materia medica were consulted and tried, but without other than palliative benefit. (*Nux moschata* helped her most.) The bromide of potassa and hydrate of chloral gave no permanent relief. A few weeks ago she was attacked by the prevailing influenza, and came near having pneumonia, but it was arrested by the free use of *veratrum vir.* A severe cough, which called for *sanguinaria*, led me to give that remedy. On the day after, she said, "Doctor, something has stopped my heart for the first time in a year." To my surprise, I found it beating regularly, quietly, at 72 per minute. Did the *sanguinaria* cause this curative action? I do not know. Her menses came on the day I gave the *sanguinaria*, and more profuse than usual, and she now began to complain of her old uterine symptoms. On examination the uterus was found retroverted—the ring pessary appearing too small to support it in proper position—and the presence of cervical inflammation was detected.

A larger ring was introduced, *lilium* and *sepia* given, but the heart still beats normally. I think the irritation was transferred or reflected from the uterus to the heart and has now returned to the former organ. What part the sanguinaria played in this case I do not know, but imagine it may have assisted in the transferrence.

Among the palliative remedies in this cardiac disorder, the *chloral hydrate* bids fair to become useful. Physicians of other schools speak highly of it in such cases. Its well-known power over nervous aberrations, whether local or reflex, appears to recommend it as a valuable agent. One of my patients, whose heart kept her awake, night after night, for months, got no sleep from any remedy until she took the chloral — 15 grains at bedtime. Under this remedy she improved decidedly in strength and appetite, and specific remedies appeared to have a better and more lasting effect in bringing about a cure.

Nux moschata has had a reputation for centuries in heart disorders of a nervous character. The symptoms given in Dr. Hering's very complete pathogenesis, prove it to have a decided influence on that organ. Among the most prominent symptoms are—*quivering, trembling, fluttering*, and *violent palpitation, labored beating of the heart,—" a fearful embarrassment.*" It is asserted to be curative in cases arising from fear, fright, grief, stoppage of urine, uterine troubles, menstrual difficulties. I do not hesitate to advise it in cardiac *debility*, with the symptoms above enumerated, especially in delicate, nervous women given to fainting, or sensitive to the slightest emotion, and when the cardiac irritation alternates with uterine or vesical disorder, or even gastric troubles. Give the 3rd or 6th trituration.

Prunus virginiana (wild cherry) has long held a high reputation in abnormal conditions of the heart characterised by *irregular, intermitting, and feeble action.* It will be found most useful when the disorder is purely functional, but it has been used with excellent results as a palliative in structural disease. The usual method of administration is in the form of cold infusion. One ounce of the inner bark (*fresh*, if procurable) in a quart of cold water. After standing six hours, it may be prescribed in wine-glassful doses every three or four hours, until there is a decided improvement. It is a safe and simple remedy, giving tone to the general system, and improving the condition of the circulation. It is a feeble analogue of *digitalis*.

*Lycopus virginicus** has some reputation for conditions similar to those for which *prunus* is recommended, but from the testimony adduced for it I think it resembles *aconite* rather than *digitalis*, and is better indicated where the pulse and heart's action is rapid, but rather hard, with or without irregularity. From some of the symptoms of the proving, as well as the results of clinical experience, it promises to be useful in that disorder known as "exophthalmus," — "Basedow's Disease" — "Grave's disease," etc. According to Flint, functional disorder may end in this condition. The *lycopus* may have the power of warding off such result. Prescribe it in lowest dilutions or mother tincture.

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*New Remedies, p. 705.

LECTURE IV.

ANGINA PECTORIS.

Nature of the Disease — Symptoms — Pathology — Pathological Relations — Its Frequency — Prognosis — Cause of sudden death in — Diagnosis — Treatment.

Gentlemen: Of all affections of the heart this is the most painful and distressing. While some authorities — among whom is Dr. Watson — would place this disorder among the organic diseases, the majority consider it a functional disease. Watson thinks it is not a neuralgia, because the paroxysms are excited by bodily exertion and mental emotion, and because it is so frequently and suddenly fatal. But Dr. C. Handfield Jones disposes of this by citing the commonly observed fact that many of the neuralgiæ are excited and aggravated by similar causes. Dr. Jones, after summing up the opinions of various authors, expresses himself in these words, "It is thus invariably a neuralgia, whose sole and constant seat is in the cardiac plexus."*

This affection is characterized by paroxysms of intense pain, emanating from the region of the heart, and extending in various directions, often into the left shoulder and down the arm, accompanied by indescribable anguish, a sense of suffocation, and a feeling of impending death. The pain radiates into both sides of the chest, into the back, upper extremities—generally the left—and sometimes extends into the lower extremities. The pain in the upper extremity does not always extend to the hand, sometimes it ends at the shoulder, at other times in the elbow, and the pain is occasionally felt only in the forearm. It commonly seems to follow the course of the nerves, and is felt all over the affected extremity, even to the ends of the fingers.

The pain is attended by a feeling of numbness, or as if the limb was paralyzed. A rare symptom is pain and numbness in the testicles. Hyperæsthesia, or tenderness, where the pain is felt, has been observed.

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* On Nervous Disorders, p. 212.

This is one of the affections that are purely paroxysmal, a strong proof of its neuralgic nature. The patient is seized suddenly, often during motion, as walking up-hill, or against a strong wind, or when quickly turning in bed.

From the first instant of attack all motion seems impossible. He seizes hold of some firm support, or fixes himself in some way immovable, until the paroxysm passes off.

Besides the pain, the feeling of suffocation alarms the patient, and he feels as if death was impending. Dyspnœa is not always present, but the breathing is often suspended for an instant, or restrained by an act of the will, for fear of increasing the pain, but the *ability* to expand the chest and breathe regularly is not impaired. Speaking is often impossible, or difficult, as it seems to aggravate the pain.

Palpitation is often present; the action of the heart, in some instances, intermitting and irregular; the pulse strong or feeble, and sometimes *very slow*. The countenance is pale and expresses terror, anxiety, and distress; a death-like complexion and haggard features suddenly taking the place of an appearance of health. Lividity is sometimes observed. The surface is cold and bathed in cold sweat. The faculties of the mind remain unaffected or nearly so. After an attack a sense of prostration is present, and sometimes, as after other nervous attacks, a free secretion of pale limpid urine.

The paroxysms differ in the frequency of their occurrence, duration, severity, etc.

They may recur every few hours, days, or weeks, and often years may elapse between them. They are sometimes very mild at first, and afterwards increase in severity; or the first may be very severe. They may last for a few moments or seconds, or continue several hours. They will often subside as suddenly as they commenced; at other times the relief is gradual.

You must not get the idea that they only occur after some physical or mental excitement, for they often occur at night, during sleep. I have known persons who were thus affected, rendered so fearful of going to sleep as to make life almost insupportable. In one case a fearful dream seemed to the patient to be the exciting cause.

You will naturally inquire what is the *pathological character* of this affection, also its pathological relations. As I have said, I believe the affection is generally a form of *neuralgia*. The character of the pain proves this. It has been ascribed to *spasm*, but a spasm of the heart, lasting as long as an ordinary paroxysm of angina, would destroy life; besides, the heart's action is seldom, if ever, arrested.

The pathological *relations* of angina are interesting. Flint says, "It involves, in a large proportion of cases, the existence of some organic affection of the heart and aorta," and adds that the lesions found "do not agree invariably in any appreciable morbid alterations." Valvular lesions may be present or wanting. Calcification of the coronary arteries is sometimes present. Fatty degeneration has been observed. It has been asserted that a "weakened heart" is essential to the presence of the disorder, but this theory is disputed by both Flint and Jones. While I do not believe that a *weak* heart is a necessary condition, it is more than probable that a condition is often present which is similar to *myalgia* elsewhere in the body. In other words, cardiac myalgia may simulate, or coexist with, angina.

As before remarked, angina pectoris is a very rare affection. In 338 cases of organic disease of the heart, Flint found it to exist in 15 only. That it occurs more frequently *with* than without organic disease seems proven.

The *causes* of this disorder are at best obscure. It has been supposed to arise from the rheumatic or gouty diathesis, but this supposition is not tenable. Nor can it be said to arise from dyspepsia. Trousseau considers angina a form of epilepsy, but this seems to me only a fanciful idea.

It occurs much oftener in males than in females, and in the majority of cases occurs after the age of fifty. But cases have been observed in youth, and even in infancy.

PROGNOSIS.

The *prognosis* will depend largely on the condition of the heart. If that organ, or the aorta, is in a state of structural disease, the prognosis is far more unfavorable than if the disorder is purely functional in character. If organic disease is present, you cannot assure the patient of exemption from their recurrence, while, if not connected with lesions, years may elapse before another paroxysm occurs.

Paroxysms of angina sometimes cause sudden death. In such instances, "the action of the heart is arrested by a morbid agency affecting it through the pneumogastric nerves, in the manner in which irritation of these nerves, or the electrical currents, produces this effect in experimental observations." (Flint.)

The danger is in proportion as the action of the heart is *feeble*, *irregular*, *or retarded during the* paroxysm. But if the action of the heart be but little, or not at all disturbed during the paroxysm, there will be but small danger of sudden death. Sudden death will oftener occur when organic disease is present, than when the disorder is purely functional. Even if organic disease is present, judicious homœopathic treatment often *cures*, and generally cures the purely neuralgic.

The *diagnosis* of this disease is generally easy. I do not see how the paroxysms can be confounded with attacks of dyspnœa, or so-called cardiac asthma, for with the latter *motion* is not incompatible, *pain* is rarely present, they do not occur *abruptly*, and there is not the same fear of impending death.

There is a *pseudo* angina occurring in hysterical, anæmic, or dyspeptic persons. The misnamed *cardialgia* may sometimes simulate angina, and I have known the *pain under the left breast*, occurring in women, to be so severe as to resemble that disorder. Intercostal neuralgia and myalgia may closely imitate it; but the *tenderness on pressure*, which is so diagnostic of the former, is rarely present in angina pectoris.

TREATMENT.

The treatment of this distressing disorder embraces:

1. Remedies which will diminish the severity and shorten the duration of the paroxysms.

2. Such treatment in the intervals as will postpone or prevent the recurrence of the paroxysms.

It is a difficult matter, as you will find, to treat a single paroxysm. It is generally of such short duration that no remedy can be selected and given before the brief "reign of terror" is over.

But in those instances in which the paroxysm is of longer duration, you should do your best to allay the terrible distress. A firm and reliant demeanor on your part—assuring the patient that he will *not* die—is of much service, for the deadly fear, added to the pain, may be a source of danger to the patient. There is some reliable testimony that a dose of *arsenicum*, 30th, has shortened the paroxysm. The same has been asserted of *lachesis*, 30th.

Certainly these remedies, if any, will act with sufficient rapidity, and are generally indicated in the severer forms.

If the action of the heart is very irregular and feeble, and there is a tendency to, or actual fainting, you should resort to the diffusible stimulants, such as brandy, or any kind of spirits which you can immediately procure, or, what is sometimes better, *ammonium carb.*, a few grains, dissolved in milk and water. A prompt resort to stimulants may save the patient's life, and ward off sudden and fatal syncope and cardiac paralysis.

If, however, the tendency to faint continues, and the pulse is very feeble, slow, irregular, or intermitting, *digitalis* is the appropriate remedy, and should be given in doses of 5 or 10 drops of the first dilution, repeated every 15 minutes. Watch the pulse, and suspend the medicine so soon as it becomes normal in force and frequency. *Digitaline*, 3rd trituration, may be substituted for the tincture.

If, with the general prostration, the skin becomes suddenly very cold and clammy, and cramps of the extremities set in, give *veratrum album* in the 6th dilution, frequently repeated.

If the *pain* is so severe as to predominate over all the other symptoms, and the action of the heart is not notably depressed, you may resort to the inhalation of *ether*. In a case which occurred in my practice several years ago, ether always gave relief in a few minutes. *Chloroform* may be used if more readily obtainable. It has one advantage, that it acts more quickly, but it should be used with extreme caution. If half a drachm or a drachm does not give relief it should not be tried further. The *hydrate of chloral* acts very quickly, and a dose of ten or fifteen grains may prove a safe and efficient palliative remedy, used for the same conditions as ether and chloroform. Never give *opium*, or any of its alkaloids; they do not act quickly enough to palliate, and are useless as curative agents.

It has been found that *electrization* of the skin in the præcordial region is remarkably effective, both in arresting the paroxysms and postponing their occurrence. It is probable that with the great advancements made in electro-therapeutics, some method of application will be discovered that will result in a more certain curative treatment than we now possess.

Swallowing pieces of ice has been found an effective measure by Romberg. The application of mustard over the region of the heart may be of benefit. Dry cupping and the hot foot-bath should not be forgotten.

You should never be at a loss for expedients in the treatment of such disorders. Anxious friends are too impatient to wait until you have tried to question the sufferer, for every moment seems an hour to both, and unless you do something very quickly, their criticisms will be anything but complimentary. Not only should you be quick to act, but you should inform the attendants just what to do if the paroxysms return, and supply them with the appropriate remedy for such emergencies. It is seldom that a physician can be procured before the paroxysm has passed; for this reason it is your duty to anticipate the treatment. I will add that you will find it difficult to decide whether your treatment has really mitigated or shortened the paroxysms, for they vary so much as to intensity and duration. Finally, you must caution them against exciting causes, namely: strong mental excitement, violent muscular exercise, excesses in eating and drinking, walking against the wind, or climbing heights.

For the radical treatment of angina pectoris the best remedies are *arsenicum*, *digitalis*, *lachesis*, *naja*, *rhus*, *aconite*, *spigela*, *cimicifuga*, and *phytolacca.*

Arsenicum is probably the most reliable remedy for the eradication of the disorder. Hartman says, "Not only the actual paroxysms, but the disease, generally finds in arsenicum its appropriate remedy, provided the disorder is not complicated with structural changes of the heart and the large arteries, or other extensive disorganizations. It is indicated if the patient can only breathe very gently, with his chest stooping forward, and if the least motion causes a complete loss of breath; if oppression and stitches in the præcordial region are associated with anxiety and a fainting sort of weakness; if the breath gives out even while the patient is getting out of bed, and it takes him a long time to recover his breath; or if the paroxysm is excited by a simple change of position in bed." To these indications I will add, that *arsenicum* is especially indicated in angina with regularly recurring paroxysms, as sometimes occurs in malarious districts. In these cases, if the 30th does not prevent the recurrence of the paroxysms, use the lower dilutions. The dose should be repeated two or three times a day.

Digitalis and *digitaline* come next in importance. Baehr asserts that he cured a case with digitaline, 2nd and 3rd trituration, "not very often repeated." The symptoms and therapeutic range of the drug correspond with the disease, whether it be a pure neurosis or accompanying organic disease of the heart. In cases of angina pectoris indicating *digitalis*, abnormal action and a sense of oppression, with tendency of syncope, are predominant. The pulsations are irregular and feeble, or spasmodic, and cause anguish and pains under the sternum and below the ribs of the right side. The pain extends to the head and left arm. Vertigo and fainting, and feeble, irregular pulse are generally present.

I advise you to use the 1st dilution, or a few drops of the tincture of *digitatis*, in a half-glass of water, and repeat the dose as often as every six hours between the paroxysms. If you use *digitalin* use the *pure* alkaloid (not Keith's or any other inefficient article), in the 1st centesimal or the 3rd decimal trituration.

You will find *lachesis* and *naja* useful when the pain and dyspnœa are concomitants of organic disease of the heart, and are attended by irritation of the glosso-pharyngeal nerves. causing distressing sensation of choking, constriction, or "rising" in the throat, and inability to speak. Use the 200th, and repeat not oftener than every 12 hours.

Aconite will prove an excellent remedy in your hands if your cases are marked by intense anxiety, fear of death, coldness, and cold sweat, feeble pulse, and intense pain in all directions, and general or local numbness and tingling. It is indicated in pure neuralgic cases, and should be used in the lower dilutions.

Spigelia has been used with good results, when there are severe stabbing stitches in the heart at every beat; pain and palpitation, aggravated by bending forward, touching the stomach, lifting the arms, or any other motion. It is useful in the purely neuralgic, and also cases of organic disease. The 6th dilution is to be preferred.

Rhus tox. is indicated in patients of a rheumatic diathesis —when the symptoms occur with or without organic disease. The characteristic indications for its use are, *stitches in the heart*, with painful lameness and stiffness of the whole body and extremities, and *pain extending down the left arm.* A case having these symptoms, also "hypertrophy with dilatation, paleness, and weakness; pulse soft, slow—48 per minute; coldness and numbness of left arm; pain worse every morning at 4 o'clock; a faint, fluttering sensation in stomach and left chest; gurgling in region of heart; soreness throughout left side; lying on left side brings on severe palpitation and pain in region of the heart," is reported as cured by the 200th of this remedy.

Phytolacca will be indicated in those cases where the pain extends to the *right* arm.

I once cured a case with *cimicifuga*,* 1st dil. The pains were sharp, lancinating, and extended all over the left chest, down the left arm, and into the back, with dyspnœa, unconsciousness, etc.

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* See New Remedies, p. 234.

If the remedies I have mentioned fail to cure, do not be discouraged, but try the *valerianate of zinc*, *laurocerasus*, *cuprum*, *crotalus*, *arnica*, and *cactus*, which last may prove to be an excellent remedy in this disorder, when its peculiar characteristic symptoms are present.*

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* See New Remedies.

PART II.

INFLAMMATORY AFFECTIONS OF THE HEART.

LECTURE V.

GENTLEMEN: I shall call your attention in this and following lectures to the

INFLAMMATORY AFFECTIONS OF THE HEART.

Inflammation of the heart may affect one or more of the structures which compose that organ. The investing serous membrane may be alone inflamed, constituting the disease known as *pericarditis*. When the membrane lining the cavities, or the endocardium, is the seat of inflammation, the affection is called *endocarditis*. Inflammation of the muscular tissue, or substance of the heart, is designated *myocarditis* or *carditis*.

Although these different inflammatory affections may exist each independent of the others, they are often associated. In many cases of pericarditis, carditis co-exists. Myocarditis very rarely occurs except in connection with inflammation of either the investing or lining membrane of the heart.

The importance of these diseases cannot be overrated, and their study is of the highest importance. They are seated in *the* great *vital* organ of the body. They involve great suffering and danger to life. Their remote consequences are very grave. All organic affections of the heart have their origin in the inflammatory. Too many physicians neglect to study this class of affections, greatly to their own detriment and that of their patients. The homœopathic treatment of inflammatory cardiac affections, if skillfully applied, is vastly superior to the ordinary methods. The late improvements in physical examination greatly facilitate correct diagnosis, and enable us to combat these diseases with the happiest results.

PERICARDITIS.

Acute pericarditis — Anatomical characters — Morbid changes — Causes and pathology — Connection with rheumatism — With albuminuria — With Bright's Disease, pyæmia, etc. — Symptoms — Of the heart — Of the circulation — Of the respiratory symptoms — Digestive organs — Brain and spinal cord — Physical signs of pericarditis — Signs furnished by auscultation, percussion, palpation, inspection, and mensuration — Summary — Diagnosis — Prognosis — Treatment.

Inflammation of the serous membrane of the heart is less common than endocarditis, but it is a more serious affection as regards immediate danger.

This membrane is like the serous tissues in other portions of the body, and inflammation results in the same changes in this, as in the pleural and peritoneal membranes. It is more dangerous than the other serous inflammations, because of the small size of the pericardial sac, and the fact that the heart-substance consists of muscular tissue, also because of the important function of the organ and its physiological relations.

In treating of *pericarditis* the following points will be considered: 1. The morbid changes incident to the disease. 2. Its causes and pathological relations. 3. The symptoms, signs, diagnosis, prognosis, and treatment.

Like other inflammatory affections, this has an acute, subacute, and chronic form.

THE MORBID CHANGES.

The inflammation is seldom diffuse, and is generally limited to single spots. The membrane at first looks injected, opaque, sometimes spotted, in consequence of slight extravasations. Acute inflammation speedily leads to exudation of lymph. This exudation takes place, in most cases, probably within a few hours from the commencement of the inflammation. It is at first of a jelly-like consistence, and adheres slightly to the membrane, forming a thin layer, either limited to the base of the organ and about the roots of the large vessels, or extending more or less over the pericardial surface. The heart, at this stage, is said to present an appearance like that of hoar frost, or to a "layer of liquid gelatine spread upon the parts with a camel's hair pencil." The exudation goes on, and generally, but not invariably, more or less liquid effusion accumulates within the pericardial sac. This effusion varies in quality and quantity. It may amount to a few ounces or to several pints. The exudation either consists of plastic lymph, mixed or not with serum, or blood, very seldom of serum alone.

The *first* stage extends to the time when the accumulation of lymph is sufficient to be determined during life by symptoms and physical signs.

The *second* stage embraces the period during which an appreciable amount of liquid continues.

The *third* stage comprises the duration of the disease after the resorption of the liquid.

These stages have been called stages of exudation, of liquid effusion, and of adhesion.

If the disease do not prove fatal, the liquid is gradually absorbed, and adhesion follows; or absorption occurs without adhesions; or a membrane may be formed from the plastic exudation; or the effused fluid may be changed to pus. The adhesions may be firm and extensive, or delicate and thread-like.

A liquid effusion sufficient to be manifested by physical signs may take place at a period of the disease, varying from one to four days from the date of the attack.

Death usually occurs during the period of liquid effusion.

The effusion is sometimes absorbed quite rapidly, in other cases slowly. In the latter instance, a condition obtains which has been called *dropsy of the heart.*

CAUSES, AND PATHOLOGICAL RELATIONS.

Acute pericarditis is rarely an idiopathic or primary disease. In the great majority of cases it is a secondary affection. There are many cases of which it is an occasional concomitant, but in the larger proportion of instances it occurs either in the course of *acute articular rheumatism*, or the renal affection known as *Bright's disease.*

Of 847 cases of rheumatism, collected from various sources, and analyzed by Dr. Fuller, it existed in 142, or about one to every six cases.

Of 50 cases collected by Dr. Flint, it existed in 19, or more than one-third.

Rheumatism is more likely to become complicated with pericarditis in the young than in the aged, and occurs oftener in females than in males.

The more acute the rheumatic affection, the greater the liability to pericarditis; and it occurs oftener during first attacks than in subsequent.

That there is an intimate relation between acute rheumatism and pericarditis admits of no doubt, but the common notion that there is a metastasis from the joints to the heart is erroneous, although some cases appear to support the supposition. The facts are that pericarditis often precedes the affection of the joints, and the inflammation of the joints does not usually subside when the heart is affected.

The true explanation of the apparent transfer of the disease, and of the relation existing, is, that the pericarditis and affection of the joints depend upon the same condition of the blood. The analogy of structure between the pericardium and the synovial membranes will account for the liability of the former to become inflamed when the latter are affected.

The connection between pericarditis and albuminuria and uræmic phenomena is now quite definitely ascertained.

Of 35 cases of pericarditis analyzed, with respect to causation, by Dr. Taylor, renal disease existed in 13.

Of 50 cases collected by Dr. Flint, renal disease was present in 7. Of 292 cases of renal disease analyzed by Frerichs, pericarditis occurred in 13. Of 135 fatal cases of pericarditis analyzed by Dr. Chambers, the kidneys were diseased in 36.

Renal disease exists in a larger proportion of the cases of pericarditis which end fatally than of those ending in recovery. The explanation of this is, pericarditis developed in connection with Bright's disease usually ends fatally; whilst in connection with acute rheumatism recovery takes place in a large proportion of instances.

What is the relation between pericarditis and certain renal affections? It is well known that serous inflammations are apt to become developed in connection with Bright's disease. These inflammations are attributed to the accumulation of urinary principles in the blood, from faulty excretory function in the kidneys. The excess of urea, or the decomposition of its products in the blood, act as poisonous agents, giving rise to inflammation of the pericardial and other serous membranes.

Pericarditis may be associated with pleurisy or pneumonia. It must not be supposed, however, that it obtains by means of extension, but results from the same pathological cause.

Pyæmia frequently co-exists with pericarditis. Wounds, and surgical operations, in tissues remote from the heart, sometimes give rise to pericarditis. The explanation is, the blood becomes poisoned so as to cause serous inflammations.

SYMPTOMS OF ACUTE PERICARDITIS.

The symptoms of pericarditis vary with the three periods of the disease. They are modified by the amount of fluid effused during the second period, and again during the absorption of the fluid in the third stage. The intensity of the inflammation may be in ratio to the severity of the pain.

In some cases, however, pericarditis may run its course with but little pain or febrile movement attendant. But this is equally true of inflammation in any organ, especially in the serous tissues.

The symptomatology of pericarditis is best treated of by taking it up in the following order, namely: The symptoms relating to the heart, and afterwards those referable to the circulatory, respiratory, and nervous system.

Symptoms referable to the heart, (1) *pain,* (2) *tenderness,* (3) *palpitation.*

Pain referred to the præcordia is a prominent symptom in some cases. It is generally burning, lancinating, and often accompanied by a sense of constriction. It is aggravated by inspiration and the movements of the body. The pain is sometimes felt in the epigastrium, or to the right side, or the centre of the sternum. It may extend to the back, to the left shoulder, and down the left arm, as in angina pectoris. The pain much resembles the pain of pleurisy, with which pericarditis may be confounded. The two diseases may, however, exist at the same time; so also may pleurodynia and intercostal neuralgia. But *pain* in pericarditis may be very slight, or altogether wanting. Dr. Flint says, in the larger number of cases observed by him, the pain was very slight.

It is a disputed question on what the pain depends. Bouilland attributes it to co-existing pleuritis. Flint refers it to the nerves of the heart. Inman says it is a myalgia of the thoracic muscles.

When pain is present it belongs to the early part of the disease. When the inflamed surfaces are covered with lymph, or are separated by liquid effusion, it diminishes or disappears, leaving only a sense of uneasiness in the præcordia.

Tenderness on pressure is generally present, but, like pain, varies in degree, and is rarely very marked. Hope says it may be discovered by pressing on the epigastrium beneath the cartilages of the ribs, in a direction toward the heart, when it is not apparent directly over the heart. Flint asserts that in order to constitute a symptom of pericarditis it must be limited to the region of the heart. If tenderness is diffused, it indicates the presence of pleurisy, or pleurodynia. It is only when taken in connection with other symptoms, that tenderness is of positive value. It is well known that in peritonitis tenderness is sometimes absent; so in pericarditis. Why this is so has not been explained.

Increased action of the heart occurs in pericarditis in the early part of the disease. The contractions are violent, and sometimes irregular, and the patient is conscious of an unnatural beating of the heart. This symptom, however, is by no means constant, and of itself is of little value, because it is found in functional disorder and organic disease.

If, during the occurrence of rheumatism, tumultuous action of the heart is noticed, it should lead to a careful examination.

In the stage of liquid effusion, palpitation cannot occur to any degree, and if the effusion is absent the heart is so weakened in the second stage as to make palpitation almost impossible.

SYMPTOMS OF THE CIRCULATION.

The *pulse* alone, in this disease, does not furnish positive diagnostic information, but when the diagnosis is made, it aids us in judging of the condition of the heart. At the outset of the disease it corresponds to the increased muscular action of the organ, and is strong, quick, and vibratory, more or less frequent, and sometimes irregular.

As the heart becomes weakened the pulse becomes enfeebled; and when, together with a certain amount of paralysis, there occurs liquid effusion, the pulse becomes weak and small, with greater disturbance of rythm.

Walshe says that the frequency of the pulse "is subject to more sudden variations from the influence of emotional excitement and effort in this than in any other disease." He adds, that he has known a gentle movement of the trunk to raise the pulse from 80 or 90 to 130 or 140.

But to the above statements there are many exceptions. Even in the first stage it may not be more frequent than in health. Graves says it is often "less frequent." It may even continue regular, and in no way abnormal.

Lividity of the lips, face, etc., may be due to a weakness of the heart, and belongs to the second stage of the disease, when it denotes serious obstruction. It is attended with feeble and irregular pulse.

Lividity is caused by congestion of the venous radicles, but generally involves some affection of the pulmonary system co-existing with pericarditis. The deficient aeration of the blood by the lungs may in such cases cause lividity. This symptom is not therefore very important as a diagnostic sign of pericarditis.

RESPIRATORY SYMPTOMS.

Respiration is sometimes accelerated in pericarditis in consequence of the inspiratory acts being shortened by the præcordial pain, and, in such cases, dilatation of the *alæ nasi* may be observed, the dyspnœa may be dependent on congestion of the lungs, incident to compression of the heart by liquid effusion, but it may be absent even when the pericardial sac is largely distended. But this symptom is not always present, for the respiration may be unaffected, or only accelerated by the febrile movement.

Cough, dry, hacking, or spasmodic, is common, and may exist independent of any pulmonary disease. It may, however, be absent in all stages. When a dry, short cough is associated with orthopnœa, a frequent and feeble pulse, and lividity of lips and face, it denotes imminent danger.

The *voice* may be very weak, the patient being unable to speak, except in feeble tones and with great effort. This symptom seems to be connected with copious effusion.

GASTRIC SYMPTOMS.

Vomiting is sometimes present and persistent, and may lead us to a faulty diagnosis in mistaking the attack for gastritis.

Dysphagia occasionally occurs, and was first noticed by Testa, an Italian author. It may be a spasmodic affection, or due to pressure of the distended pericardial sac upon the œsophagus.

SYMPTOMS OF THE COUNTENANCE, POSITION, ETC.

An expression of *anxiety*, or apprehension, is often a prominent symptom. The *risus sardonicus* has been observed in seven cases which terminated fatally. The *position* of the patient is generally on the back, or diagonally, between that on the back and on the side. It is rarely on the left side, the liver in this position pressing on the heart. In some cases the patient can lie comfortably on the right side. Generally, the patient desires to have the head and shoulders raised. But whatever position the patient selects he is *very reluctant* to change it, owing to the great increase of the pain or distress, and the excitement of the heart, which gives rise to a feeling of syncope, especially when the sac is filled with fluid. Fatal syncope has been induced by change of position. Flint refers to several cases, and I have observed it to occur in one case of rheumatic pericarditis, and in several cases where cardiac disease was complicated with diphtheria.

SYMPTOMS OF THE NERVOUS SYSTEM.

In addition to the mental anxiety, depression, and fear of death observed in cases of pericarditis, actual delirium may exist. It has not been considered an element of the disease.

There are, however, cases of pericarditis in which the cerebral symptoms are so marked that they may mask the cardiac inflammation. These cerebral symptoms may simulate meningitis, mania, dementia, coma, epilepsy, tetanus, and chorea. In many cases of supposed cerebral disease terminating fatally, autopsy shows no appreciable lesion of the brain and spinal cord. But if the examination had included the heart, pericarditis would have been found to have existed.

Dr. Burrows* was the first to call special attention to this connection of cerebral symptoms with cardiac disease. Dr. Flint alludes to several interesting cases of a similar character which came under his observation. These two authors show conclusively that the physician may mistake an inflammation of the pericardium for an inflammation of the brain. In the 16 cases detailed by Burrows there occurred delirium, convulsions, agitation of the limbs resembling chorea, dementia, coma, and seizures resembling apoplexy and tetanic spasms. Flint's cases had delirium, with wild, staring expression, inability to protrude the tongue, shouting as if from danger, coma, great agitation, blindness of one eye, etc. One patient " ejected saliva with great force, and in all directions."

Several cases have come under my own observation. One very notable case, in a girl eight years of age. The symptoms all simulated meningitis, and it was only when my attention was called to the heart by the full and very irregular pulse, that physical examination disclosed the presence of pericarditis.

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* "On Disorders of the Cerebral Circulation and on the Connection between Affections of the Brain and Diseases of the Heart."

Flint says the delirium is peculiar, "the patient lying in a species of coma vigil, the eyes open and fixed in one direction, not replying to questions, and incapable of being roused; this state was followed by maniacal excitement, the patient shouting, and apparently laboring under fear of harm, with occasional ebullitions of hilarity. A fixed delusion of having committed some crime appears to be a distinguishing feature."

From the above symptoms—and this peculiar delirium does not occur in meningitis—and also the absence of acute pain in the head, throbbing of the carotids, injection of the eyes and face, we may know that the disease is not cerebral. The delirium resembles somewhat *delirium tremens*, in which condition the heart is often much disordered. This fact may lead us to understand the curative action of *digitalis* in *mania a potu.*

I wish to call attention to a fact which Flint has not mentioned, namely, the disordered action of the heart in idiopathic brain affections. In some cases of meningitis, and nearly all cases of *tubercular* meningitis, the pulse is at first full and irregular, afterwards soft and fluttering, then intermitting, irregular, full, slow and labored, easily quickened by motion or mental disturbance to double its previous amount of pulsations.

When we reflect that these symptoms also occur in pericarditis, we shall admit that it may be possible for the physician who neglects physical examinations to make a wrong diagnosis. I have seen cases of tubercular meningitis in which the beating of the heart and the character of the pulse simulated pericarditis. The physical signs on percussion were, however, wanting. In such cases the disorder of the heart was functional, or reflex, the nervous irritation being transmitted through the phrenic and pneumogastric nerves, just as in reflex disorder of the brain from pericarditis, but in a contrary direction. I will here remark, that for brain symptoms arising from diseases of the heart, *digitalis* is generally specific; but if the contrary obtains, it is *not* indicated.

PHYSICAL SIGNS OF PERICARDITIS.

The symptoms of acute pericarditis above enumerated are not alone sufficient to enable us to diagnose with certainty the presence of that disease. But by means of the physical signs obtained by percussion, auscultation, palpation, inspection, and mensuration, the disease may now be generally recognized with a degree of positiveness which clinical observers, not many years ago, regarded as unattainable.

Instead of entering into a profuse description of these signs occurring in pericarditis, I shall take the liberty to present the admirable summary given by Dr. Flint, in his work on Diseases of the Heart:

PERCUSSION.

"Enlarged area of præcordial dullness; the extent of this area greater in a vertical than in a transverse direction; its shape corresponding to the pyramidal form of the pericardial sac when distended; the dullness within this area, and the sense of resistance on percussion greater than over the præcordial region in health, or in cases of enlargement of the heart. These signs denote an abundant effusion within the pericardial sac.

"Moderate or small effusion denoted by increased width of the area of dullness at the lower and middle portions of the præcordial region. The increase of the area of dullness taking place within a few days or hours, and progressing rapidly; its extent varying on different days during the course of the disease. Dullness from the presence of liquid below the point of the apex-beat of the heart. Diminution of the area of dullness, with more or less rapidity in the progress of the disease toward convalescence, and its final reduction to its normal limits; when convalescence is established."

AUSCULTATION.

"A friction sound developed, usually, soon after the commencement of the inflammation, depending on the exudation of lymph; rarely wanting during the period of the disease which precedes that of liquid effusion; frequently, not invariably, disappearing during the period of effusion; often returning after the absorption of liquid, and sometimes persisting after adhesion of the pericardial surfaces has taken place. Intensification of the heart sounds at the commencement of the disease, or prior to liquid effusion; during the period of effusion, both sounds weakened, but especially the first sound; the element of impulsion in the first sound notably impaired or lost, and this sound, therefore, consisting of the valvular element alone, resembling the second sound as regards quality and duration; the sounds apparently distant, and the apparent distance greater when the patient is recumbent on the back.

"Cessation of respiratory murmur and vocal resonance, concurring with the results of percussion, in determining the enlarged area of præcordial dullness dependent on distension of the pericardial sac."

PALPATION.

"Prior to the period of effusion, the cardiac impulse abnormally forcible, violent, extending over a larger space than in health, and sometimes tumultuous beating of the heart. After effusion, the point of apex-beat raised, and carried to the left of its normal position. Suppression of the apex-beat, if the quantity of liquid be large. Return of the beat when the liquid diminishes. Vibration of the thoracic walls in the præcordia before, and sometimes after the period of effusion, constituting tactile friction—fremitus. Retardation of the apex-beat in some cases, after a certain amount of effusion, so that the first sound precedes it by a distinct interval."

INSPECTION

"Prominence or arching of the præcordial region in some cases during the period of effusion, if the pericardial sac be distended, observed chiefly in young subjects; the prominence presenting an indistinct outline of the pyriform shape of the pericardial sac. Restraint of the respiratory movements of the left side, if the quantity of liquid be large, and also, prior to effusion, in some cases, from pain felt in the act of inspiration. Undulatory movements in the intercostal spaces over the pericardium distended with liquid, in a very small proportion of cases. Depression of the præcordial region in some cases, after the absorption of liquid."

MENSURATION.

"Prominence of the præcordia in some cases, produced by liquid accumulation in the pericardial sac, determined by callipers. Sudden development, or increase of prominence, and its sudden or rapid disappearance."

DIAGNOSIS.

If the physician depends altogether upon the *symptoms* supposed to indicate pericarditis, he will find the diagnosis of the disease to be difficult, and often impossible. It has been shown that cases may occur which do not show symptoms of a positive character. It is only since the discovery of physical exploration, that the diagnosis is made comparatively easy. But since this method is still neglected to much extent, pericarditis is habitually overlooked by many medical practitioners.

There are many diseases having pathological relations to pericarditis, and during the progress of those diseases we should be on the watch for the earliest evidence of its development. During the progress of *acute rheumatism* the præcordial region should be daily explored with reference to the signs of pericarditis, as well as endocarditis. We may, in such cases, discover the friction-murmur before the patient makes any complaint of pain or other symptoms denoting that the pericardium has become involved.

In view of the fact that inflammation of the pericardium as well as other serous structures, is liable to be developed in patients affected with *disease of the kidneys*, we should not neglect to examine the chest from time to time.

The diagnosis of pericarditis from *pleuritis* or *pneumonia* is sometimes difficult. In such instances the heart should be closely interrogated.

We may hear a friction-murmur in pleuritis, produced *outside* the pericardial sac. It will be found difficult to discover the presence of liquid effusion in the pericardium when, at the same time, it exists in the *left* pleural sac; while, if the effusion is in the right pleural cavity, we can readily distinguish it from pericardial effusion.

Flint says that he has known acute uncomplicated pericarditis to be considered and treated, throughout the disease, as pleurisy, when the diagnosis was based on *symptoms* alone, and I have no doubt but such instances are very numerous, too numerous in fact for the dignity and honor of medical science.

Dropsy of the pericardium may be mistaken for the stage of pericarditis with effusion. But the former rarely occurs except in connection with general dropsy, and then not to the same extent as in pericarditis. Moreover, hydro-pericardium is not preceded by pain, tenderness, fever, etc., nor is it attended by the friction-murmur.

PROGNOSIS.

Pericarditis is always a serious affection, and its progress should be watched with great solicitude. In no disease must we attend so closely to the development of the various stages.

Different observers vary in their testimony as to the fatality of the disease. Dr. Hope declared that in ten years he did not lose a case. Of 106 cases analyzed by Louis, 36 died. In 84 cases reported by Latham, only 8 died. Of Dr. Flint's 50 cases, 27 died; but these were unusually bad cases variously complicated.

According to Flint, pericarditis is least fatal when rheumatic; more dangerous when occurring during renal affections, eruptive and continued fevers, pyæmia; and generally fatal when associated with marked disorder of the nervous system, giving rise to mania, tetanus, chorea, etc. Under judicious homœopathic treatment this rate of mortality would probably have been less. Dr. Russell's success in the London Hospital was certainly very satisfactory.

The *duration* of the disease is variable. It may prove so rapidly fatal as to kill in 24 hours. It lasts usually from one to two weeks, and, if not ending fatally in this time, ends in recovery, or the chronic form.

The termination, in favorable cases, is more or less adhesion of the pericardial surfaces. Flint considers it doubtful if the exudation is ever completely removed by absorption —leaving the surfaces unattached and free from disease. He also considers it *the* rule that the pericardial sac is obliterated, from adhesion throughout its entire surface. Of 156 cases of pericardial adhesions analyzed by Louis and Chambers, 111 were universal.

Death occurs in pericarditis from arrest of the circulation, from paralysis of the heart, from the combined effects of the pressure of the liquid effusion and the proximity of the inflamed membrane to the muscular fibres of the organ. It must be remembered that death from the slightest over-exertion may occur during the stage of effusion.

TREATMENT.

The treatment of inflammatory cardiac affections has not yet received that careful study in our school which their importance demands. Notwithstanding this, we can safely assert that our treatment is far more successful than that of the allopathic school; or, with greater propriety it might be said, than the *former* treatment by that school, which consisted of blood-letting, calomel, blisters, opium, etc. The allopathic treatment, as at present adopted by its best practitioners is far more rational than ever before—it is even homœopathic—as witness the treatment advised by Dr. Flint, who discards blood-letting altogether, and says of mercury, that it should not be used in Bright's disease, anæmia, or any cachectic state; and other authors deny its efficacy in idiopathic or rheumatic pericarditis. Flint says of opium, that it is a very important and valuable remedy, but he relies more upon *aconite* and *digitalis* than any otheragents, and these he uses in a strictly homœopathic manner.

If the homœopathic school is limited to a few remedies, it is because our provers have not paid sufficient attention to objective symptoms. In but few of our provings has any proper record been made to the cardiac symptoms developed. The objective symptoms have been neglected, and the subjective only vaguely recorded. Not only this, but even in the few reported clinical cases of heart-disease found in our literature, no physical exploration of the chest was made, to confirm the diagnosis, and in many cases we are in doubt whether they were really cases of disease of the heart.

The following are the chief remedies to be selected in *pericarditis:*

Aconite. The symptoms of the aconite-heart-disease are prominent and unmistakable. It is indicated in the *first* stage of the disease, or until the exudative process is completed. It is not so often indicated in the second stage—or stage of liquid effusion—and rarely in the third stage. The action of aconite is twofold. Primarily, in large doses it depresses the vitality of the heart even to the point of paralysis. But the reaction which occurs is a secondary effect, and results in hyperæmia and inflammation; but this inflammation does not go to the extent of causing liquid effusion, nor does it cause organized exudation of lymph. The following are the symptoms for which it is indicated in the first stage:

The beats of the heart are more violent and rapid; the pulse hard, strong, and *contracted* (*not* full and bounding). The pain, if any is felt in the cardiac region, is burning, lancinating, and constrictive, or stitching. There may be tenderness on pressure over the cardiac region, or in the epigastrium under the ribs. The skin is very hot, with burning and intense thirst. The urine scanty and red. The countenance expresses great anxiety, and there is always present a fear of death. The position of the patient is on the back, with the head and shoulders raised. Any movement aggravates the pain, if any. But cases of pericarditis occur without pain, and here we must depend on physical signs. If fever is present, and the heart's action is hard and rapid, and pulse hard, and percussion and auscultation shows the first stage, then is aconite still indicated. It is *not* indicated in the first stage of pericarditis, when the cause is Bright's disease, or pyæmia, but only in idiopathic, traumatic, or rheumatic cases.

If we expect *aconite* to act well in this stage, we must give the lower dilutions, 1st to 3rd, or even a few drops of the mother tincture in half a glass of water, a spoonful repeated every hour or two. Nor shall we find it useful after the first 12 or 36 hours. So soon as we discover the pulse to grow weaker, and the action of the heart less violent, the size of the dose must be changed, or some other remedy must be selected. Baehr says, "*Aconite* is not only indicated at the commencement of the disease, but, in many cases, during its whole course, more especially in rheumatic cardiac inflammations, so long as the organic alterations do not result in paralytic or cyanotic symptoms."

I cannot support these assertions. *Aconite* is indicated in the second and third stages, but not on account of any inflammatory action supposed to be existing, but because it is homœopathic to threatened paralysis. Baehr himself admits this, virtually, when he says aconite is also indicated when the "beats of the heart become slower, or else they remain quick, and grow feeble or irregular; or a feeble and small pulse, not synochrous with the beats of the heart, intermitting or unequal, the temperature is lower, and the number of respirations increase rather than decrease." But Baehr says nothing about changing the size of the dose when the symptoms change. The physician who gives the same dilution of *aconite* in the second as in the first stage will be disappointed, and do injury to his patient.

The dose in the second and third stages should never be lower than the *third* dilution, unless the powers of absorption are very feeble. These stages are similar to the primary stages of aconite-poisoning, when the cardiac nerves are brought to the verge of paralysis. The 30th or 10th is the proper attenuation to use when we give it for feeble and irregular cardiac action.

Asclepias tuberosa will be found useful in some cases of pericarditis. Its action is quite analogous to *bryonia.* The symptoms point rather to a sub-acute than an acute condition. I have used it in one such case with excellent results. The asclepias-fever is not intense, the pain in the cardiac region is pricking, there is shooting pain near the left nipple extending to left shoulder, with a feeling of constriction in the region of the heart. A dry, spasmodic cough, with some dyspnœa, is generally present. The pain in the chest is relieved by bending forward. There is palpitation of the heart, with pulse 88 and small. It is indicated in sub-acute cases, with liquid effusion, the absorption of which it hastens, and should be used in the lowest dilutions. The *asclepias syriaca* is indicated in similar conditions, namely, the second stage, when the disease is connected with uræmia, with copious liquid effusion. Its action on the kidneys is similar to colchicum.

Bryonia alba is doubtless one of our most valuable remedies in the first and second stages of pericarditis. Its action begins when the exudation of plastic lymph appears, and as this often occurs very soon, it is best to alternate it with *aconite*, or follow closely after that remedy. It is indicated in those cases of idiopathic or rheumatic pericarditis, with or without pleurisy, with intense fever, frontal or occipital headache, and acute stitching pains aggravated by the slightest movement. I do not consider it the best remedy in cases of liquid effusion, nor does it do any good in cases of feeble, irregular, or intermittent cardiac action. The heart's action is not violent or tumultuous, but the friction-murmur is always heard, dulness on percussion is present, the point of apex-beat raised and carried to the left, and the heart's sounds intensified (at first), then both sounds weakened. It is of no value in pericarditis from Bright's disease or pyæmia, nor when the effusion is copious, and aeration of blood deficient.

Arsenic. The testimony relating to the efficacy and applicability of arsenic in pericarditis is quite conflicting. Baehr says, "we have never seen any good effects from it in acute conditions. It is a remarkable fact that among the large number of cases of poisoning by *arsenic*, *post-mortem* examinations have never yet revealed a single symptom that might lead us to infer that *arsenic* exerts a specific action upon the heart."

Dr. Russell, on the contrary, asserts that *arsenic* exerts a powerful influence on the heart and lining membranes, both internal and external. He quotes Orfila, who found "small spots of a bright crimson color in the left ventricle and on the columnæ carneæ, and this color penetrated deeply into the substance. The right cavities presented spots of much deeper red—almost black color." But he did not find the serous membrane inflamed.

If *arsenic* is homœopathic to pericarditis, it is to that variety caused by uræmia or pyæmia, in which conditions the nervous life of the organ is poisoned. It may be homœopathic to carditis, and also to the second stage of sub-acute or chronic pericarditis, with serous or liquid effusion, associated with great irritability and tendency to paralysis.

The symptoms indicating arsenic are: great anxiety in the region of the heart, with fear of death; tightness in the præcordia; cannot lie down; dyspnœa and palpitation after the slightest motion; great thirst; violent, tumultuous action of the heart, *alternating* with feeble, irregular beating; tendency to fainting; pulse strong and jerking, or feeble, fluttering, and irregular; cold skin, hands, and feet. The pain is piercing, burning, and a sensation of soreness in the region of the heart.

The physical signs on percussion and auscultation are: dullness over a greater extent than usual in the cardiac region, especially in a vertical direction; the element of impulsion in the first sound is impaired or lost, the sounds apparently distant.

The *iodide of arsenic* will doubtless prove a superior remedy in such cases. *Dose*, the 3rd or 6th trituration.

Digitalis is one of the most useful remedies in pericarditis, but in order to use it successfully you must fully understand its sphere of action. Not only this, but you must know how to graduate the *dose* to suit the varying phases of the disease.

I will first give you the opinion of Baehr, and then my own. He says, "Since I have devoted, for years past, special attention to the use of this drug, I have found it much more frequently applicable in the treatment of disease than in former times; and I am now prepared to assert most positively, what I was then only able to announce in rather dubious language, that *digitalis* is an excellent remedy in acute diseases of the heart, more particularly to *pericarditis*. *Digitalis* is not so much adapted to inflammations setting in with very violent symptoms, but to inflammations approaching in an insidious and scarcely observable manner, more especially without any local pain, but with a rapidly increasing embarrassment of the respiration. We should take a very one-sided view of the action of this drug, if we were to regard the irregularity and slowness of the pulse as the chief criterion for its application, since a rapid and very weak pulse constitutes an equally reliable indication. Even a violent excitement of the functional activity of the heart, as generally occurs at the commencement of cardiac inflammation, is in characteristic accord with the first symptoms of poisoning by *digitalis*. Among all the various forms of cardiac inflammation, we consider the rheumatic form the best adapted to *digitalis*, and likewise if it is associated with a copious effusion of serum; less, however, to pericarditis, if the friction murmurs continue unchanged from the beginning of the disease. The sooner these murmurs disappear, the better is *digitalis* adapted to the case. * * Among the general symptoms, the following invite more particular attention to the use of *digitalis:* Rapidly increasing dyspnœa, with occasional symptoms of acute congestion of the chest; inflammation of the pleura or lungs; bronchitis; chronic catarrh of the bronchia; expectoration mixed (not streaked) with blood; spasmodic cough; livid, turgescent face, with blue lips, headache, vertigo, delirium, sopor, vomiting, at the commencement or during the course of the disease; hyperæmia of the liver; slight icterus; catarrh of the kidneys; excessive feeling of illness, not corresponding with the perceptible symptoms; great anxiety, but without any continual restlessness; aggravation by the slightest motion; a drawing, tearing pain in left shoulder."

Dr. Baehr's experience coincides with my own. In my several papers on the action of *digitalis* I have always contended for the double action of this drug, and unless such action is fully understood, you cannot prescribe it successfully. In its primary action, *i. e.*, its pathogenetic effect in large doses, it first causes a hyper-stimulation of the cardiac tissues, manifested by increased force, and *sometimes*, not always, frequency of the heart's action; and this may go on to the very verge of acute inflammation, or to a condition of the heart culminating in tetanic spasm of that organ. *Digitalis* is not so much indicated in acute as *sub*-acute pericarditis, in its first stages. It is not indicated for plastic exudation, but only for serous effusion; and not so much for the inflammation itself, as its results, and the excessive irritation of the cardiac nerves which attends it. If given in the first stages the doses must be made very small, not lower than the *third* decimal dilution. It is very important to understand the secondary action of *digitalis*. After it has exhausted the nervous and vascular irritability of the heart by its primary action, a contrary condition sets in. The heart's vitality is lowered, its pulsations decrease in *force*, but increase in frequency, or become very irregular and intermittent; the slightest motion or excitement increases the heart's action in a very distressing manner, and death may occur from cardiac paralysis.

You will observe that Baehr mixes the primary and secondary symptoms and conditions in his indications. This is unfortunate, for if the practitioner does not separate the two states, he will forever be in the dark regarding the true action of the drug, and never be able to prescribe it with safety and benefit to his patient.

I have given you the symptoms and conditions indicating *digitalis* in the first stage of pericarditis, and the dose required. Its most useful sphere, however, is in the second and third stages, or those conditions characterized by liquid effusion, failure of the nervous and muscular power of the heart, from pariesis or over-distension, and accompanied by excessive irritability. The physical signs in this condition are: absence or decrease of the friction-murmur; rapidly increasing dullness over a large area; heart-sounds weakened, especially the first, the element of impulsion in the first sound nearly or entirely lost, the sounds apparently distant. The posture is generally with the head and shoulders raised. The patient cannot lie on the left side, the slightest movement increases the distressing dyspnœa. Sometimes the urinary organs are affected, and urination becomes frequent and painful — the secretion scanty, but of nearly normal color. An excessively *faint* "empty" feeling at the pit of the stomach is a notable indication for *digitalis*. Under its use the effusion rapidly diminishes; the heart's action soon improves in force; its irritability diminishes with the increased tonicity; the lividity of the face and lips disappears, as does the dyspnœa, vertigo, and imperfect circulation everywhere. But in order to effect this curative action, you must know the requisite dose. Any attenuation above the third decimal is useless. The tincture, or first decimal, is usually required, and must be given in doses of one to five drops every hour or two until decided improvement sets in, when the intervals between the doses may be lengthened, or the quantity decreased. I have frequently found the patient so near cardiac syncope, that I have without hesitation given *ten* drops of the strongest tincture, and, with my finger on the pulse, watched its effects. If the pulse did not rise, or increase in force in fifteen minutes, the dose was repeated, and this was continued until I was satisfied the dangerous exhaustion was over. In such cases of threatened or actual collapse, you may think *veratrum album* or *arsenicum* better indicated, but neither are as reliable as *digitalis*. After you have warded off the immediate danger, prescribe the *digitalis* in smaller doses, and place the patient under the influence of wine-whey, egg-nogg, beef-tea, cocoa, and other highly nutritious articles.

Spigelia is an important remedy in pericarditis, but the provings were conducted with such disregard for physical or objective symptoms, or even correct subjective symptoms, that it is difficult to define clearly its curative sphere.

Baehr says the symptoms given by him are not pathogenetic but clinical, and even these "do not contain the symptoms of sero-plastic or serous pericarditis. On the other hand we distinctly recognize in this complex of symptoms, both the purely *plastic*, as well as incipient endocarditis." He further adds that "according to practical experience, *spigelia* is particularly adapted to rheumatic pericarditis, likewise to sero-plastic pericarditis during its whole course, especially if the patient complains of internal local pain;" but he asks "upon what basis are we to prescribe spigelia in cases where the disease is painless and has scarcely any symptoms?"

He gives the following symptomatic indications from Hartmann; indications which are based on curative results on the sick, namely: "Undulating motion of the heart; indistinct beats of the heart running into one another; when laying the hand upon the heart, tumultuous beating of the heart, in a recumbent as well as in a sitting posture, not synchronous with the radial pulse; spasms of the chest; suffocative complaints; tremulous sensation in the chest and temples, increased by motion; tearing sensation in the chest when raising the arms over the head, and when touching the pit of the stomach; purring murmur during the beats of the heart; stitches in the region of the heart; pulsations of the carotids with a tremulous motion; great dyspnœa at every change of position; bright redness of the lips and cheeks, changing to pallor dnring every motion; the impulse of the heart raises the four last true ribs, the sternum and xiphoid cartilage, and displaces the dorsal vertebræ; audible beating of the heart, causing a pain that is felt through to the back; cutting pains from the heart to the shoulders, as far as the head and arms; excessive dyspnœa, with a pressing, cutting pain in the abdomen, at the insertion of the ribs; arthritic pains and stiffness of the joints; dull stitches where the beats of the heart are felt, and recurring with the measured regularity of the pulse; the beats of the heart can be felt through the clothes, with anxious oppression of the chest; scraping in the throat, affection of the tracheal and bronchial mucous membranes; the beats of the heart are not synchronous with the pulse; purring murmur." (Dose, 3rd to 12th dilutions.)

Nitrum (kali nitricum) ought to prove curative in some cases of pericarditis, especially if it appears as a complication of acute rheumatism or Bright's disease. It has many symptoms which indicate its use in cardiac inflammation.

Gelseminum is rarely indicated in acute inflammations of the heart. It may be useful in the *first* stage, and for a very short time. It is useful in cases having a *catarrhal* origin; rarely, if ever, in rheumatic pericarditis; and never when from diseases of the kidneys.

The symptoms calling for its administration are: chilliness, then fever, with feeling of dullness, heaviness and swimming in the head (occiput); stitching sensation in the region of the heart; constrictive pain around the lower part of the chest; sudden attacks of suffocation; inspiration of a sighing and catching character; expirations sudden and forcible; heart's sounds intensified; pulse full, rapid, soft.

For these symptoms the proper dose lies below the 2nd dilution. No result will be gained in inflammatory affections if the higher attenuations are used. Its administration should not be continued after the pulse becomes slower and softer, unless we change the dilution to the 6th or 12th, for if indicated in the third stage, it is for the tendency to paralysis of the heart, which is a primary effect of the medicine.

Veratrum viride. The same remarks are applicable to this medicine that have been applied to gelseminum. It may, however, be given in those cases of idiopathic or rheumatic pericarditis that are ushered in by violent fever, full, hard, bounding pulse, with congestion to the head, throbbing carotids, etc. The pain is burning, constant, with oppression of the chest; sensation as of a heavy load on the chest; heart's action violent and tumultuous; respirations rapid, labored, and sighing. *Dose*, 1 drop of the tincture, or first decimal dilution, repeated every two hours.

Unlike the *veratrum alb.*, it cannot be used in the second or third stages, unless we have the rare phenomena of vomiting, cold skin, pulse 20 or 30, and here it must be given in the 6th dil.

In cases of poisoning by *verat. v.* (in cats) serum to the amount of 1℥ to ½℥ was found in the pericardium.

Colchicum has been recommended for pericarditis, especially rheumatic. Baehr says, "it seems to us to be improperly ranked among cardiac remedies." In cases of poisoning, no pericardial lesions were observed; in fact the pericardial sac was found *empty*. Muller, however, says that *colchicum* is more suitable for pericarditis than endocarditis. Baehr asserts that all the heart-symptoms are secondary from loss of fluids. In Laurie's Practice a case is reported where colchicum removed the following symptoms (after *lach.* and *ars.*): dullness on percussion over a larger space; friction-noise at the sternum stronger than before, impulse more powerful, but the natural heart-sounds impaired and distant; great dyspnœa and faintness on the slightest movement; oppression after eating or drinking ever so little; no cardiac pain; position on the back, with head and shoulders raised." This would seem to prove that it was useful in the second stage. It is probable that the best indication for *colchicum* in pericarditis is the co-existence of rheumatic inflammation elsewhere, and the urinary symptoms indicating that medicine.

Dose: The dilutions from the 1st to the 6th.

Tartar emetic, according to Russell, is a good remedy in some cases of rheumatic pericarditis, and for the following urgent symptoms: "*Great dyspnœa*, and violent pain at the heart, with cough." But he evidently does not believe it to be a specific remedy, but removes this dyspnœa, etc., by its action on the lungs, and its effect on "the pulmonary branches of the pneumogastric nerve, by sympathy with the cardiac."

Dose: Grain doses of the 2nd or 3rd dec. trituration.

Kalmia latifolia. Of this remedy Hering says, "No remedy in the whole materia medica has such control over the pulse, except *digitalis*." "In diseases of the heart which alternate with rheumatism, or have originated in rheumatic attacks, kalmia must become important." No clinical reports have been made to substantiate this statement, nor do we know of any reliable symptoms of the medicine indicating its use. If useful at all, it is in the first stage.

Cactus grandiflora was strongly recommended by Dr. Rubini for "all inflammatory affections of the heart." He does not, however, mention pericarditis among his clinical observations, but says it cures pleurisy and inflammations of serous membranes. If homœopathic to pleurisy, it is probably also to pericarditis. The symptoms seem to indicate its tendency in that direction: "Sensation of constriction of the heart. Dull, heavy pains in region of the heart, increased by external pressure. Pricking pain in the heart, impeding respiration and motion of the body. Very acute pain, and such painful stitches in the region of the heart as to cause him to weep and cry out loudly, with obstruction of respiration. Palpitation of the heart continues day and night. Fever, with great heat, violent pain in the head," etc. It is to be greatly regretted that Dr. Rubini made no observation of the pulse, or examined the condition of the heart by physical exploration. Such neglect is a loss to science, and utterly unpardonable. Cactus may be indicated in any stage of pericarditis, and the best effects have been obtained from the lowest dilutions.

Cannabis. Baehr seems to confound the cannabis *indica* (haschisch) with *cannabis sativa*, which latter possesses, in no degree, the cerebral symptoms of the former. *Cannabis sativa* has been recommended in pericarditis, but upon very unreliable data. Baehr gives the following symptoms of *cannabis indica:* "Violent palpitation of the heart, sometimes without any anguish, sometimes attended with perfect agony." It is indicated in cases of pericarditis with cerebral symptoms. *Dose*, 1st to 3rd dilution.

Sulphur has not usually been mentioned in connection with pericarditis, but its pathogenesis contains many symptoms relating to the heart. From analogy, however, I claim that it ought to receive more attention as a cardiac remedy.

You have been taught how useful it is as a remedy in pleurisy, in the stage of exudation, also its power over obstinate inflammations.

Its action on the pericardium is doubtless the same as on the pleura. If it will cause absorption of plastic lymph in one serous membrane it will in any other. Baehr mentions "a case of pericarditis where uncommonly loud friction-murmurs and a rubbing of the pericardial surfaces against each other, that could even be felt by the hand, and had already existed for upward of three months, disappeared entirely after sulphur had been given for a fortnight." You may give sulphur with great confidence where there is plastic exudation, if the inflammation seems to linger, notwithstanding the free use of bryonia. (Dose, 1st to 30th.)

Iodine, or *iodide of potassa*—I prefer the latter—will be found useful in cases quite similar to those for which I have recommended sulphur. Iodide of potassa has great power in causing absorption of morbid products. It removes the plastic and serous exudation in pleurisy and pericarditis. The pathogenetic symptoms recorded in the *Symptomen Codex* are very suggestive, and closely simulate the pains of pericardial inflammation. (Dose, one-half to two grains in an ounce of pure soft water every four hours.)

The alkaline treatment, although not dynamic, but chemical in its nature, has some claims upon your attention. The theory advanced in its support is this: alkalies are supposed to exert their effect by neutralizing the *materies morbi* in the blood, and also to eliminate them from the body. The bicarbonate of potassa or soda are the alkalies preferred, and it is considered necessary to give as much as three or four drams daily, until the urine becomes *alkaline*. It is claimed by Fuller, that rheumatic pericarditis may be prevented if the alkaline treatment is carried to this extent. Dr. Richarsdon's researches appear to substantiate this assertion, for of 48 cases in which the "full alkaline treatment" was employed, the heart was affected in but *one* case. He contrasts these with 110 cases treated by bleeding, nitre, mercury, etc., where the heart was affected in 35. Flint, however, says he has known cases in which pericarditis occurred during the "full alkaline treatment," and after alkalinity of the urine had been produced. Dr. Russell (homœopathist), in his Clinical Lectures on Rheumatism, approves of the alkaline treatment, and says that it cannot interfere with the action of specific remedies. He believes that we ought to neutralize and eliminate the lactic acid, and thus remove the cause. He also believes that both *aconite* and *bryonia* act by removing the cause which develops the lactic acid, and in this way, perhaps, act as curative agents in rheumatic affections.

I have frequently tested the value of the alkaline treatment, and believe acute rheumatic affections generally run a shorter course under such treatment. You may give ten or twenty grains, or more, of the bicarbonate of soda or potassa, or the citrate of potassa, largely diluted with gruel or pure water, three or four times a day, until the urine becomes alkaline, which condition is readily ascertained by testing that secretion with litmus paper.

RECAPITULATION.

For *pericarditis*, as a complication of acute rheumatism, the remedies are, *aconite*, *gelseminum*, *veratrum viride*, *asclepias tuberosa*, *bryonia*, *cimicifuga*, *colchicum*, *cactus*, *nitrate* and *iodide of potassa*, *digitalis*, *spigelia*, and *sulphur*.

For *pericarditis* from Bright's disease, *arsenicum*, *phosphorus*, *kali nitricum*, *colchicum*, *asclepias syriaca*, *digitalis*, and *benzoate of ammonia*.

For *pericarditis* from pyæmia, *arsenicum*, *baptisia*, *phosphorus*, *carbolic acid*, and the *sulphite of soda*.

For threatened *cardiac paralysis*, *digitalis*, *veratrum album*, *lachesis*, *naja*, *gelseminum*, *aconite*, *veratrum viride*, and *arsenicum*.

For pericarditis, with *pneumonic* complication; *phosphorus*, *tartar emetic*, *kali nit.*, *sanguinaria*, *bryonia*, *veratrum viride;* with pleurisy; *bryonia*, *asclepias tuberosa*, *arnica*, *iodide of potassa*, *sulphur;* with cerebral irritation, *cannabis ind.*, *veratrum alb.*, *cimicifuga*, *belladona*, *digitalis*, and perhaps *opium*.

For *hydropericardium*, or copious effusion of serous fluid, *digitalis*, *arsenicum*, *colchicum*, *apocynum cann.*, *benzoate of ammonia*, *nitrate* and *iodide of potassa*, *iodide of arsenic*, and perhaps *apis mel.*

DIETETIC AND HYGIENIC TREATMENT.

During the first or acute inflammatory stage, the diet should consist of the lightest kind of food. Cardiac inflammations do not exhaust the general system as much as other inflammations, and less food will sustain the vital forces. All stimulating or highly nutritious food and beverages should be prohibited. Mental and bodily exertion must be avoided as much as possible.

In the stage of effusion, when the heart becomes weak and irritable, the only change in diet and regimen you should advise, would be to permit light soups and broths, or weak beef-tea, if the patient desires them. In this stage *tea* should be strictly prohibited, and absolute mental and physical repose insisted upon. In threatened paralysis you may administer cautiously alcoholic stimulants, beef-tea, carbonate of ammonia, and even apply the electro-galvanic current in desperate cases.

If I have not fully impressed upon you the importance of insisting upon absolute quiet, and the recumbent posture, I will here repeat, that you should insist that the patient must not be raised in bed to eat, drink, urinate or defecate, nor turn on his side unaided, for any such movements in severe cases may result in fatal syncope.

External applications on the chest, over the region of the heart, may be of benefit in some cases by assisting in the reduction of the inflammation, or palliating the pain. Warm poultices of flax-seed meal, medicated with *tincture of aconite* or *verat. viride*—or compresses of quite warm water, may be applied during the first stages. In the latter stages, I cannot recommend you to prescribe any external application.

LECTURE VI.

ENDOCARDITIS.

Definition — Anatomical Characters — Causes and Pathology — Symptoms — Physical Signs — Diagnosis — Prognosis — Treatment.

GENTLEMEN: I shall, in this lecture, take up one of the most important of the inflammatory affections of the heart; more important than pericarditis, because of the serious valvular lesions which it usually leaves.

An inflammation of the membrane which lines the cavities of the heart, and is duplicated to cover the valves, is called endocarditis. It is not more than fifty years since this disease has been clearly described and recognized, but clinical experience has demonstrated that it is by no means infrequent. In the majority of cases it occurs as a complication of acute rheumatism. The inflammation may be acute, subacute, and chronic, but these distinctions are not of practical value.

ANATOMICAL CHARACTERS.

This inflammation is said to be confined, in the vast majority of cases, to the membrane lining the cavities of the left side of the heart. The lining membrane of the right auricle and ventricle is rarely inflamed, and when inflamed it is also present on the left side.

All portions of the endocardial membrane of the left side are not equally subject to inflammation. You must bear in mind that it generally attacks the membrane covering the valves and lining the orifices, and that it is in these situations that it leaves the most troublesome results. There are two reasons for the tendency to attack these localities. 1st. The membrane here is most exposed to the blood-currents; the valvular portion is in constant motion, and is almost constantly in a tense or strained condition. 2nd. The membrane is here underlaid by fibrous tissue, and not, as in other situations, in close proximity to the muscular walls of the heart.

Flint believes there are grounds for believing that the fœtus *in utero* is subject to endocarditis, and that the inflammation is then limited to the *right* side. He believes the malformations found in infants—cyanosis, etc.—may thus be accounted for.

In the occasional instances in which death has occurred during the inflammation, there has been found (a) redness from vascular injection, (b) alterations in the membrane itself, and (c) the presence of inflammatory products.

(a) *Redness*, due to endocarditis, is caused by injection of the vessels which ramify in the areolar tissue beneath the membrane, but it is not always found, and may disappear as a *post-mortem* change. But the *redness*, when found, is not always a proof of inflammation, for it may be the effect of the imbibition of hæmatin dissolved out of the red globules of the blood which the cavity contained after death. This redness from imbibition, however, is distinguished from that due to inflammation by these differences: (1) It is not an arborescent, but a uniform redness, and when examined with a lens, injected vessels are not visible; (2) It has a deeper and darker color than inflammatory redness; (3) It is *not* more likely to be limited to the left than the right side, nor is it usually limited to the valves and orifices, and is more conspicuous in the arteries than in the cavities of the heart. Moreover, in redness from imbibition, the membrane preserves its normally firm, polished appearance.

(b) *Alterations in the membrane itself* are much more indicative of inflammation than redness. These changes are: "loss of the smooth, polished appearance which the membrane has in a healthy state; instead of which it becomes opaque, rough, velvety, and felt-like; more or less swelling and softening; and brittleness of the subjacent areolar tissue." (Flint.)

(c) *The presence of inflammatory products* will prove to you conclusively, if present, that endocarditis has existed. You remember that the endocardium, unlike other serous membranes, is *not* a shut sac, wherein inflammatory products may be collected and retained. Such products may be washed away by the currents of blood and carried along with the circulation. Another difference is that the free surface of the endocardium is in contact with the blood itself, and that while the fluid detaches and removes morbid products, it may also *furnish* deposits by yielding a portion of its fibrin, which undergoes coagulation.

These products of inflammation, then, may be derived from two sources, namely: the exudation of lymph, and the coagulation of fibrin from the blood. The exuded lymph occurs on the free surface of, as well as beneath, the endocardium. That on the free surface, if not washed away, forms layers, as in pericarditis. The roughness of the exuded lymph attracts—as it were—fibrin from the blood, as the threads did when passed through the arteries in Dr. Simon's well known experiments. When we consider that in acute rheumatism the fibrin of the blood is in excess, we can see how the tendency to fibrinous depositions is greatly increased in endocarditis from that cause.

Various *morbid growths* are to be enumerated as the result of endocarditis. They are commonly called *vegetations*, and are found either at the base or the free extremities of the valves. They occur in the form of small granular masses, or beads, from the size of a pin's head to a millet seed, studding the margins of the curtains of the mitral valve, and fringing the crescentic extremity of the fibrous portion of the segments of the valves of the aorta.

Virchow denies the occurrence of the exudation of lymph in endocarditis. He accounts for the formation of excrescences and membraniform layers wholly to proliferation or morbid growth, and the coagulation of coagulated fibrin from the blood within the cavities of the heart. Flint, however, believes that morbid growths may have, as a nucleus, the true vegetations or exuded fibrin, to which may be added the coagulated fibrin from the blood.

Other morbid changes may occur, namely: loss of substance by ulceration and erosion; perforation of the valves; lacerations; and even gangrene. Among the rarer occurrences are adhesions of the valves to each other, or to the walls of the heart.

The *remote* effects of endocarditis will be considered in future lectures, when we come to consider the Organic Diseases of the Heart. I will only say here, that in a very large proportion of cases, valvular lesions, involving either obstruction or regurgitation, or both, owe their origin to the anatomical changes which occur as a result of endocarditis. It may be months or years before serious structural changes obtain; but you should carefully watch your patients who have had this disease, and be on the look-out for the first symptom of organic affection, for it is rare that they are escaped altogether.

CAUSES AND PATHOLOGICAL RELATIONS.

Endocarditis is rarely an idiopathic affection. Like pericarditis, it is usually associated with acute articular rheumatism. It differs, however, from the former, in occurring independently of that affection, and is a comparatively rare affection as occurring in other pathological connections. When the two diseases occur together, the combined affections are designated *endo-pericarditis.*

Of 474 cases of rheumatism, collected and analyzed by Fuller, endocarditis existed in 214, the ratio being 1 to every 2.25 cases. Of 204 cases, endocarditis existed in 138, pericarditis in 19, and endo-pericarditis in 38. Bamberger says endocarditis occurs in 20 per cent. of all cases of rheumatism.

The connection of endocarditis with acute rheumatism is the same as that of pericarditis. It is not developed as a metastasis, but depends upon the same morbid condition that causes the rheumatic affection.

Endocarditis may become developed in connection with renal disease, owing to the analogy of structure between the endocardium and the serous membranes. (See Pericarditis.)

It is said that in non-rheumatic endocarditis the aortic valves are more likely to be the seat of inflammation than the mitral; the reverse being true, as has been seen, of rheumatic endocarditis.

Endocarditis and pericarditis are frequently associated. Fuller says that in 204 cases, analyzed by him, this combination existed in 38. Either affection may take precedence in point of time.

Endocarditis is sometimes associated with pleurisy or pneumonia. It is less frequently associated with these affections than pericarditis. Endocarditis is occasionally developed in connection with the eruptive and continued fevers, and with that morbid condition known as pyæmia, but its occurrence in these connections is rare. It may also be produced by injuries of the chest; but cases of traumatic endocarditis are rare.

The experiments of Richardson, made by injecting into the peritoneal cavity of a dog a solution of lactic acid, containing ten per cent. of the acid, seems to show that *lactic acid*, when absorbed into the blood, will cause endocarditis.

In about twelve hours after the operation, the symptoms and physical signs of endocarditis appeared. Richardson regarded his experiment as proving synthetically that rheumatic endocarditis is produced by a similar agent. In rheumatism the morbid conditions are supposed to be caused by the presence of *lactic acid* in the blood.

PATHOLOGICAL RESULTS OF ENDOCARDITIS.

Endocarditis may give rise to immediate pathological results which are important, namely: emboli, or plugs, consisting of detached vegetations, or excrescences, which, propelled with the current of blood into the arteries, are at length arrested in their course in trunks too small to permit their further progress, giving rise to arterial obstruction and diminished supply of blood to certain parts. For a further consideration of this subject, see *Valvular Lesions.*

"The solidified products in cases of endocarditis, namely: fibrin and lymph, are, to a greater or less extent, disintegrated by the blood-currents, and carried into the circulation, either in solution or suspended in the form of minute particles. It is supposed that the comminuted solid deposits, transported to different organs, and becoming arrested in the capillary vessels, may give rise to vascular obstruction and secondary inflammation in these organs. The kidneys and spleen are most likely to be the seat of disease thus induced. These effects are primarily mechanical; but it is highly probable that morbid changes in the blood itself are sometimes induced by the admixture of the liquid products of endocardial inflammation. It can hardly be otherwise if, as is not improbable, purulent matter is occasionally formed on excoriated or ulcerated surfaces, which are in some instances observed after death in cases of endocarditis." (Flint.)

The formation of large masses of fibrinous coagula in the cavities of the heart belongs to the immediate pathological effects of endocarditis. It is supposed that these ante-mortem clots are the formations called by the older writers, polypi of the heart.

SYMPTOMS OF ENDOCARDITIS.

The symptoms of endocarditis are less distinctive even than those of pericarditis. Occurring generally in connection with acute rheumatism, its symptomatic indications are merged in those of the latter affection. In a large proportion of cases, there are no symptoms which attract attention to the heart as the seat of any disease. Examination, however, with a view to determine the presence, or otherwise, of phenomena which point to endocarditis, may elicit symptoms which are of importance in the diagnosis. These symptoms consist of pain referable to the heart, symptomatic fever, and excited action of the organ, or palpitation. Symptoms arising from obstruction to the passage of blood through the orifices of the heart, do not belong properly to the symptomatology of endocarditis, but are due either to lesions resulting from endocardial inflammation, or to accidental events, such as the formation of coagula. (Flint.)

Pain is very rarely a prominent symptom, and, as in other serous inflammations, is sometimes altogether absent. Even when it is present it is not easy to refer it to endocarditis, except by taking into account other symptoms, and especially the physical signs. The pain is generally dull and obtuse, rarely sharp or lancinating. A feeling of uneasiness hardly amounting to pain, is sometimes referred to the præcordia. The suffering which patients endure from the pain in the joints is so much more severe, that they will not be likely to mention the uneasiness in the heart unless you question them closely. If the pain in the region of the heart is so severe and acute as to cause complaint, the probabilities are that pleurisy or pericarditis is present, rather than endocarditis.

The *fever* is not of any importance, for it is not distinctive of this disease.

Palpitation in endocarditis may arise indirectly from excitation of the muscular structure of the heart. The action of the heart may be irregular, as well as unnaturally excited.

The *pulse* may not correspond with the action of the heart, for while the latter may be acting with increased *force*, the pulse may be weak.

If you observe these symptoms occurring during the course of acute rheumatism, you may safely suspect the presence of endocarditis, and you should resort to physical examination without delay.

PHYSICAL SIGNS OF ENDOCARDITIS.

Increased extent and degree of dullness on *percussion*, due to tumefaction of the heart, and accumulation of blood within its cavities, is considered by Bouillard and others as a physical sign of endocarditis. Flint, however, doubts whether the cardiac enlargement often, if ever, exceeds the limit of healthy variations. He thinks if the heart is found enlarged, there must have been a previous hypertrophy. He says, "how far the size of the heart undergoes alterations during the progress of endocarditis, I am unable to say from my own observations, but it is evident that percussion cannot afford very important information with reference to this disease, except in a negative point of view, that is, by aiding in the exclusion of other cardiac affections, more especially pericarditis."

Palpation and *inspection* will furnish evidence of excited action of the heart. The impulse is seen and felt to be more violent than in health, or out of proportion to the amount of febrile movement which exists. But the signs furnished you by these methods of exploration will be of little value to you except as associated with other evidences of endocardial inflammation.

Auscultation will furnish you with the only positive proof of the existence of endocarditis, and this proof is the development of the endocardial murmur.

This assertion has been substantiated by clinical experience, and you should give particular attention to its study. The murmur is usually soft, having the character of a bellows-sound. It is systolic, for it accompanies the first, or systolic sound of the heart, but you will not find it always at the commencement of the disease. In fact, its existence is considered rare in that stage. I cannot give you any certain data as to the period of inflammation in which this murmur occurs. There are conflicting opinions on this point. The time of its appearance is, however, in the opinion of all authorities, quite *variable*. The endocardial murmur is not, *of itself*, absolute proof of existing endocarditis. Previous valvular lesions may be a cause of the murmur. It occurs in consequence of blood-changes, independently of inflammatory or organic disease of the heart.

Under what circumstances then, you will ask, is the presence of the murmur a diagnostic system of endocarditis? If you find an endocardial murmur in connection with symptoms denoting cardiac inflammation, and if acute rheumatism co-exists; and, further, if you have made previous careful explorations, and failed to discover any murmur, you may then conclude that the murmur you have detected is a sign of endocarditis. If, however, the murmur is discovered on *first* examination the symptom is of doubtful value.

A murmur developed by endocarditis generally continues not only throughout the duration of the disease, but even afterward. There seem to be some exceptions to this rule, for Flint says he has repeatedly known a *mitral* murmur to disappear entirely after recovery from rheumatism, when it was very marked during the disease. This could only occur in those rare cases in which the swelling of the valves diminishes, and the vegetations are detached and washed away, leaving the endocardial surface smooth.

I need not inform you of the *cause* of the murmurs alluded to. It is doubtless due to a roughness of the endocardial membrane covering the valves, produced by the lymph, fibrin, and vegetations; although some authors have conjectured that the murmurs were due to a spasmodic action of the papillary muscles, preventing the mitral valve from fulfilling its function—allowing regurgitation to take place.

The *heart-sounds* may be abnormally modified during endocarditis. Reduplications have been observed. The first sound, and sometimes the second, may be less distinct than in health, or the first sound may be wanting.

DIAGNOSIS.

You will find that the diagnosis of endocarditis does not depend upon symptoms, but almost entirely on evidence developed by auscultation. Those of you who attempt to rely upon symptoms alone will necessarily overlook this important disease, and allow your patients to lose the aid which might be afforded in the prevention of organic disease. Never neglect this in cases of acute rheumatism. Examine your patient every day, and be on the watch for the *endocardial murmur*, which is the only sure evidence of this disease.

But, as I stated a few moments ago, you cannot give a positive opinion unless you have been watching for this murmur at a time before it existed, for if you heard it at the first examination, it may have previously existed from some valvular lesion of long standing. You will readily deduce from this caution, that it will be very difficult, if not impossible, for you to detect endocarditis in a patient who has any organic disease of the heart.

As idiopathic endocarditis is the rarest of all diseases of the heart, I will not enter into discussion of its diagnosis. I must inform you, however, that pericarditis is so often associated with endocarditis, that you will rarely find the latter free from the former. In the diagnosis of endopericarditis, you will have to compare the signs of both;

but, happily, the treatment of these affections is not materially different.

PROGNOSIS.

The prognosis of endocarditis is generally favorable, so far as any immediate danger to life is concerned. The symptoms may continue, and the condition become chronic, and cause great inconvenience, and exist for a long period. Chronic endocarditis may be suspected if the patient continues to complain of uneasiness in the heart, and that organ continues unnaturally excited. But this disease, when chronic, so nearly simulates valvular disease, that the prognosis depends on the extent of the structural lesion.

Certain accidental events may occur during endocarditis which may seriously endanger life, namely: the formation of fibrinous coagula; the detachment of vegetations or of masses of fibrin or lymph, constituting emboli; the admixture of disintegrated solid deposits; and purulent infection of the blood.

If we can judge of the prognosis from recorded clinical experiences, we can believe that, in a large majority of cases of endocarditis, recovery takes place without serious accidents. The cardiac symptoms gradually disappear. The patient, however, is generally left exposed to the evils arising from valvular disease, which may become developed at a period more or less remote, unless your treatment has prevented such a result.

TREATMENT OF ENDOCARDITIS.

The treatment of endocarditis cannot be disposed of so summarily as some authors have done, by asserting that there is "no essential difference" in the treatment of endocarditis and pericarditis. Not only is the treatment not the same, but the objects of treatment are dissimilar. Flint very tersely observes, that in pericarditis the compression of the heart by the accumulation of liquid within the pericardial sac is a source of distress and danger; and to prevent this accumulation, and promote its removal, are important therapeutical ends. In endocarditis, however, the action of the heart is free from all mechanical restraint. In pericarditis the inflammation is more generally diffused, and a greater effect is produced upon the muscular walls, first by excitation, and afterwards by paralysis. In endocarditis the inflammation is seated especially in the membrane connected with the valves and orifices, when it is not in contact with the muscular walls, and the latter are consequently affected in a less degree. In pericarditis the aim of the practitioner is often to avert impending death. In endocarditis there is little fear of a fatal result.

But although the two affections are so dissimilar in many respects, the general principles of management are in a great measure alike applicable to both.

The therapeutical indications in the treatment of endocarditis relate mainly to the alterations to which the membrane is exposed, and to the products of inflammation.

Your objects must be to diminish as much as possible the local effects of the inflammation; then to aid in restoration from these effects, and thus protect the organ from the remote consequences arising from incurable and progressive unsoundness. In other words, you must accomplish, if possible, the following results:

1. Abate the intensity of the inflammation.
2. Abridge its duration.
3. Limit the exudation of lymph.
4. Diminish the precipitation of fibrin.
5. Effect the removal of solid deposits.

The remedies to which you must resort to gain these ends are, mainly: *aconite*, *veratrum viride*, *digitalis*, *arsenicum*, *spigelia*, *phosphorus*, *colchicum*, *bryonia*, *asclepias*, *lachesis*; *naja*, *sulphur*, *belladonna*, *rhus*.

Aconite is useful in the first stage of the disease, when the pulse is hard, small, and quick, and there is pain of a sharp, pricking description in the cardiac region, with anxiety, fear of death, faintness, oppression, and tumultuous action of the heart, (see also "*Aconite*" in Pericarditis.)

Veratrum viride you will find useful in those cases which are ushered in by a more violent congestion, pain, and intense force of the circulation. The bounding pulse—full, hard, and quick; the intense throbbing headache, *without delirium*, will indicate this remedy, in the lowest dilutions. With these two agents, aided by a low diet and absolute rest, you will be able to abate the inflammation and shorten its duration. But the disease is often so rapid in its course, that you will be obliged to anticipate the second stage, and alternate with the above:

Bryonia, if the pains are of the severe *stitching* character peculiar to the medicine. This remedy is powerful against the exudation of lymph, and is equally useful in endocarditis as in pericarditis.

Asclepias tuberosa, as I remarked when speaking of pericarditis, has nearly the same sphere of action as *bryonia*.

Colchicum is probably more suitable to pericarditis than endocarditis. I am of opinion, however, that it is not so much the local condition that indicates this remedy, as the condition of the blood. *Colchicum* causes an extraordinary increase in the secretion of uric acid, and it is this which makes it such an invaluable remedy in cardiac affections occurring during attacks of gout. It is, however, equally useful in rheumatic endocarditis.

Belladonna is an excellent remedy in endocarditis, especially when there is secondary irritation and congestion of the brain, and also where there occurs congestion of the chest. It is best indicated when the first is passing into the second stage, and we have the following symptoms: aching in the cardiac region, taking one's breath away and causing anxiety; occasional intermittence of the pulse; irregular, unequal contractions of the heart; throbbing pain beneath the sternum, near the epigastrium; violent heart-throbbing, with jarring of the head and neck.

Digitalis, from the very nature of its action, cannot prove of much value in endocarditis, unless it be associated with pericarditis. As Baehr very properly remarks, "In endocarditis it seems almost impossible to indicate special heart-symptoms requiring the use of *digitalis;* in such cases, the constitutional symptoms will have to determine our choice." However, as endocarditis rarely occurs unattended by some pericardial inflammation, *digitalis* should always be thought of, and selected according to the indications given under pericarditis.

Arsenicum will not control acute endocarditis, but will be found useful in those severe paroxysms of palpitation, or the attacks of cardiac syncope, which sometimes occur. It will be most indicated if Bright's disease or pyæmia be the cause of the endocardial inflammation.

In direct contradiction to Baehr, Dr. C. Müller asserts that "*Arsenic* has been found serviceable in palpitations, carditis, endocarditis, rheumatic, and organic diseases, especially of the left side of the heart," and he adds that "*Arsenic* possesses the most perfect specific and homœopathic relation to endocarditis. It is indicated not only in the commencement of the disease, but also when exudations and vegetations have formed on the endocardium and valves, especially of the left ventricle. It is hence the main remedy in Bouilland's so-called chronic endocarditis. It is indicated when the following physical signs are present: dullness over a greater extent than usual in the cardiac region, especially in a vertical direction; violent and irregular action of the heart, with feebleness or almost complete extinction of pulse; indistinctness, or roughness, of both sounds of the heart, or a bellows-murmur with the first sound, heard on the left ventricle and along the aorta, but loudest over the aortic valves, viz., at the edge of the third rib, near the left edge of the sternum."

Spigelia, according to Baehr, is only useful in incipient endocarditis, or to endocarditis generally before marked valvular changes have taken place. For the special indications for *spigelia*, I refer you to your notes on pericarditis, and the remarks I shall make in the future consideration of valvular diseases.

Phosphorus will undoubtedly be of use to you in some cases of endocarditis. I can do no better than to give you the indications pointed out by Baehr, which I consider reliable. He says "*Phosphorus* is clearly suitable for inflammation of the endocardium and the muscular tissue, never for pericarditis. The constitutional symptoms would lead us to recommend *phosphorus* in endocarditis associated with pneumonia, against the cardiac inflammation, not against the pneumonia, for we have already stated that when pneumonia is complicated with cardiac inflammation, the presence of the latter constitutes an absolute obstacle to the absorption of the pneumonic exudation. In the next place, *phosphorus* takes the precedence over every other medicine in cardiac inflammation, when occurring as complications of such processes as lead us to infer a dissolution of the blood, like scurvy, puerperal fever, malignant exanthematous diseases, typhus, etc. Finally, we possess few remedies that embody in their pathogeneses as plain a picture of nephritic and cardiac inflammation as *phosphorus*."

Baehr is of opinion that we have often cured cardiac inflammations with *phosphorus* without knowing it. In the conclusion of his observations he says, "Finally, we have to point out a symptom which most decidedly indicates phosphorus, we mean the dilatation which develops itself during endocardial inflammation with such surprising rapidity."

I will add that *phosphorus* appears to be pathologically indicated in this disease. The *post-mortem* appearances observed after poisoning by *phosphorus* are: the muscular tissue is flabby and easily torn; opaque appearance and intersticial distension of the endocardium; bloody infiltration, which in certain circumscribed spots penetrates the whole thickness of the muscular tissue. If, in addition to these appearances, we consider the very feeble, small, and exceedingly frequent pulse; the frequent observation that the sounds of the heart either often disappear or are replaced by murmurs, we cannot deny that this remedy ought to be tried in severe cases, especially those of a secondary character.

Lachesis, as well as all the serpent-poisons, exerts a profound and specific action on the heart, and more upon the endocardium than the pericardium. In all cases we find an unusual increase of the frequency of the pulse, which becomes feeble and small, or intermittent; there is pain in the region of the heart, the pain being sometimes intense; palpitation of the heart; fearful anguish; bloody expectoration, with constant hacking cough; marked symptoms of cyanosis; icy coldness of the extremities, with cold perspiration; paralytic sensation in the whole left side of the body, or a violent pain in the left shoulder and left arm. In my opinion, *lachesis* (also *crotalus* and *naja*) is indicated in the second and third stages of very acute and severe cases of endocarditis, when arising from pyæmia, typhus, or during malignant eruptive fevers. It is homœopathic to the vegetations and structural changes which occur, for *post-mortem* examinations after death from serpent-poisoning have always shown the heart more or less affected. The endocardium in the region of the valves is infiltrated and easily torn; ecchymoses cover its internal and external surfaces; and exudations occur in the muscular tissues of the heart. Take these indications, together with the many symptoms recorded in our *materia medica*, and you will have no difficulty in selecting *lachesis*. *Dose:* the dilutions from 6th to 30th.

Iodine and its combinations should not be neglected by you in endocarditis. They are indicated in sub-acute cases, and not so much for the inflammation as for the structural changes occurring on the valves.

Cuprum aceticum has been reported by a Dr. Kissell* as having cured three cases of rheumatic endocarditis, but the testimony is based on the observation that " Auscultation revealed a bellows-sound at every other beat of the heart; feeble pulsation of the heart." The symptoms of the heart were: "pressure under the lower part of the sternum, and oppression of the chest; pulse, 85; quick pulsation of the heart, and the tone feeble and dull, as if it came from great depth."

Dose: the tincture, or 3rd to 6th triturations.

Apocynum androsemifolium. In endocarditis-rheumatica, when the rheumatic affection has been confined to the hands and feet, and there is present considerable gastric and hepatic irritation.†

Dose: the first dilution has been found most useful.

Asclepias syriaca, as you will observe from the provings, will likely prove of service in endocarditis from renal affections, or from a retention of scarlatinal poison.

Dose: the tincture, a few drops, in water.

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* Marcy and Hunt's Practice.

† New Remedies, 2nd Ed.

Baptisia will prove in your hands an unrivalled remedy in endocarditis during or following typhoid or other low fevers, especially when you have present its well known characteristic symptoms.

Dose: the first decimal dilution, in drop doses.

Cactus grandiflorus will never fail you, in the severest cases of the acute form, if that peculiar symptom, "Sensation of constriction of the heart, as if from a band around it, preventing movement," is present. No other remedy equals it in controlling the severe nervous palpitations common to the disease. I get the best effects from the 1st dil.

Cimicifuga must not be forgotten in the treatment of endocarditis rheumatica. It may be better suited to pericarditis, but if the former affection have a rheumatic origin, I see no reason why this remedy should be neglected. If the endocardial inflammation occur in a woman from suppression of the menses, and there is also intense headache, delirium, stitching pain in the region of the heart, in the infra mammary region, and down the left arm, you can give the *cimicifuga* with every prospect of success.

Dose: the dilutions below the 4th.

Hamamelis. I have reason to believe that in certain cases of phlebitis, the inflammation may be transferred or extend to the heart. If such a condition does occur, this remedy will be found useful. In the provings we find it to cause pricking pain in the region of the heart, felt also in the superficial veins of both arms, continuing for ten days. By referring to the provings you will find other important symptoms of cardiac inflammation. This medicine acts best in the lowest dilutions.

Lachnanthes will have to be used if cerebral symptoms occur, which indicate its use. The cardiac symptoms of this remedy are also notable.

Lobelia inflata has been used successfully in some cases of endocarditis. The characteristic symptoms calling for its administration are very striking: excessive vomiting; an intense sensation of sinking at the stomach; sighing; great dyspnœa; deep seated pain in the region of the heart; and small, quick, and feeble pulse.

Dose: the dilutions from 1st to 6th.

Phytolacca may prove useful in sub-acute or chronic endocarditis if the patient has rheumatic symptoms, and the cardiac pain extends to the *right* shoulder and arm instead of the *left.*

Sanguinaria. The sphere of action of this medicine resembles that of *phosphorus*, in so far as the complication of endocarditis with pneumonia may occur. If you meet this complication in practice, do not forget to study the provings of *sanguinaria*, for you may find it indicated when *phosphorus* or *sulphur* have been used without the expected curative results. If the *right* lung is the seat of the inflammation, it is to be selected instead of *phosphorus.*

You will remember that in my lecture on pericarditis I mentioned the efficacy of the alkaline treatment, as a means of combatting the existing pathologico-chemical cause of rheumatism. The same observations will apply to that treatment in endocarditis. It may also prevent the formation of the solid products incident to the latter, by depriving the blood, to a certain extent, of its excess of fibrin. The *carbonate of ammonia* has been highly recommended for this purpose, as being more powerful than other alkalies, and it is affirmed that its use will prevent the formation of large fibrinous coagula.

The indications during convalescence and subsequently are: to advise against undue exercise, the abuse of stimulants, the avoidance of agitating emotions, and excesses of any kind, which might bring back the inflammation, or hasten the development of structural lesions. But you must not go so far as to alarm your patient to exceeding caution, for an extreme sedentary life should be equally avoided. An amount of physical activity necessary to vigorous health is not unfavorable as regards the liability to organic disease. You must not excite the fears of your patient, for the moral effect of looking forward to probable organic disease is not favorable to mental or bodily health.

MYOCARDITIS.

A brief allusion to myocarditis will close this lecture. This is an inflammation of the muscular structure of the heart. The muscular substance of the heart is the seat of inflammation much less frequently than the investing and lining membranes of the organ. It rarely, if ever, occurs independently of endo- and peri-carditis. Either the investing or lining membranes, or both, are implicated. The inflammation, probably, in most instances extends from these membranes to the muscular substance. Theoretically, it ought to occur more frequently as a complication of muscular than synovial rheumatism. Practically, however, we do not know that this is the case. The inflammation is usually limited to certain portions of the heart, and it occurs much oftener in the left than in the right ventricle. It may be confined to the outer or inner layers of muscular fibres; or it may extend throughout the walls and affect the *columnæ carnæ*. The septum is less likely to be affected than the ventricular walls. The results of myocarditis are *suppuration*, *induration*, and *aneurismal dilatation*. Rupture of the heart may also occur.

Where abscesses exist, there is purulent infiltration of the surrounding parts. The formation of abscesses destroys the muscular structure to a great extent. They may discharge their contents into the pericardial sac, giving rise to acute pericarditis; or they may evacuate into the ventricular cavity, and give rise to purulent infection of the blood. In either case a fatal result is inevitable.

The *diagnosis* of myocarditis is nearly impossible. There are no symptoms or signs which can warrant a positive opinion.

The *treatment* does not differ materially from that advised in the former diseases. I will suggest, however, that where there is reason to suspect myocarditis, *aconite*, *bryonia*, *belladonna*, *cimicifuga*, and other medicines having a special affinity for muscular structure, would be chiefly indicated.

PART III.

ORGANIC DISEASES OF THE HEART.

LECTURE VII.

GENTLEMEN: You have followed me with excellent attention through the lectures on Functional and Inflammatory Diseases of the Heart. It is now my duty to give you the history and treatment of those diseases of the heart which are termed *structural*, for the reason that they all present some lesion which changes its normal structure, and I will commence with the various forms of

HYPERTROPHY.

Definition and Varieties of Hypertrophy — Enlargement by Hypertrophy — Concentric Hypertrophy — Symptoms and Pathological Effects — Physical Signs and Diagnosis of Enlargement by Hypertrophy — Summary of the Physical Signs of Hypertrophy with Enlargement of the Heart—Treatment.

Enlargement of the heart is a term which embraces abnormal increase of this organ, as regards either volume or weight, or, as is commonly the case, increase both in weight and volume. Increase of the volume of the heart, and increase of its weight, are different forms of enlargement, either of which, although they are usually associated, may exist independently of the other. The heart may exceed the limit of health as regards weight, from an increased thickness of its walls, the normal volume being retained. This is a condition sometimes found after death, although in the vast majority of the cases in which the weight is augmented the volume exceeds the healthy limit.

On the other hand, the volume of the heart may be abnormally great, the cavities being enlarged, while the thickness of the walls is so far diminished that the normal weight is retained. The latter form of enlargement is also of very rare occurrence, the organ generally increasing in weight when its volume is greater than in health. Abnormal increase of the heart in weight, due to morbid thickness of the muscular walls of the organ, constitutes the morbid condition called Hypertrophy. Abnormal increase of the heart in volume, due to the morbid size of its cavities, constitutes the morbid condition called Pilatation. These names, hypertrophy and dilatation, thus denote different forms of enlargement of the heart, which exist sometimes separately, but usually together. Hypertrophy and dilatation have been subdivided by writers into several varieties, the subdivisions being based on well-marked distinctions.

latation

First. Hypertrophy exists, in some cases, without any alteration of the cavities, the latter remaining normal. This has been called pure or simple hypertrophy.

Second. The cavities are sometimes found to be diminished in size below the limit of health. This has generally been admitted as a variety of hypertrophy, although its existence, as a morbid condition, is open to doubt. It has been distinguished as concentric hypertrophy, or hypertrophy with contraction.

Third. The variety occurring much more frequently than the others is characterized by the co-existence of dilatation to a greater or less extent.

This variety has been called eccentric hypertrophy, or hypertrophy with dilatation. Dilatation, on the other hand, differs in different cases, according to the thickness of the walls of the heart.

First. It exists in some cases, the walls retaining their normal thickness. This has been called pure, or simple dilatation. It is obvious, however, that in proportion to the dilatation, the heart is hypertrophied, assuming the walls to preserve their normal thickness, inasmuch as the quantity of muscular structure and the weight of the organ, under these circumstances, must be increased.

Second. In other cases, in which the capacity of the cavities is increased, the thickness of the walls is diminished. In this variety, the weight of the heart may not exceed, and may even fall below, that of health. This has been distinguished as dilatation with attenuated walls, or attenuated dilatation.

Third. The variety of dilatation which occurs with far greater frequency than either of the other varieties, is characterized by increased thickness of the walls, or well-marked hypertrophy, the dilatation, however, being predominant. These subdivisions, although based on distinctions which are valid, are embarrassing to the student. They are consistent with the different morbid conditions of the heart, as determined by examinations after death; but they are not accompanied by diagnostic criteria, by means of which they may be discriminated at the bedside during life. A simpler arrangement is clinically more available, and suffices for all practical purposes.

We may distribute all cases of enlargement of the heart into two groups: 1st, Enlargement by hypertrophy; and, 2nd, Enlargement by dilatation. These groups will include, respectively, cases in which the hypertrophy or the dilatation is either simple or predominant.

In cases of enlargement by hypertrophy, the cavities may, or may not, exceed their normal capacity. Cases in which the cavities are diminished will also fall in this class. If the hypertrophy be neither simple nor concentric, it is included in this class whenever it is greater than the co-existing dilatation. The symptoms and signs enable the diagnostician to determine, often with positiveness, the existence of hypertrophy, which may be either simple, or predominant over a co-existing dilatation; but to discriminate between the cases in which the hypertrophy is simple, and those in which it predominates over co-existing dilation, is a problem in diagnosis by no means easily solved.

So, in cases of enlargement by dilatation, the quantity of muscular structure may, or may not, exceed the limit of health. The diagnostic criteria of predominant dilatation are often sufficiently positive; but it is far less easy to decide whether the dilatation be accompanied with hypertrophy or attenuation. Moreover, as regards prognosis and treatment, after the existence and degree of enlargement are ascertained, it is enough to determine which form of enlargement predominates, namely, either hypertrophy or dilatation.

ENLARGEMENT BY HYPERTROPHY.

Under this head, it is to be borne in mind, I include, not only enlargement due exclusively to increased thickness of the muscular walls, but enlargement by hypertrophy with dilatation, provided the former predominate over the latter. In examining the heart, after laying open the cavities and removing their contents, the predominance of either hypertrophy or dilatation is generally obvious to the eye. The two forms of enlargement are combined, in different cases, in every degree of relative proportion.

In determining, then, whether the enlargement be by hypertrophy or by dilatation, the question is, which contributes most to the morbid size, increase of the structure, or increased capacity of the cavities. Instances, however, occur in which these two forms of enlargement are about evenly balanced. On measuring and weighing the heart, the excess of weight is greater than the abnormal dimensions, in proportion as hypertrophy preponderates.

The walls are more solid and resisting. The ventricles retain their rounded form when the heart is placed on its posterior surface, not being flattened by the collapse of the ventricular walls. If the increased thickness of the walls of the ventricles be due purely to hypertrophy, they present externally, and on section, the appearances of healthy muscular structure, and the microscope shows the characters of the normal tissue; the hypertrophy, causing abnormal volume and weight, is due to increase of the muscular substance.

The heart may be more or less enlarged by an accumulation of fat upon the surface and between the muscular fibres, or by the presence of different morbid products in these situations. Under these circumstances, notwithstanding the abnormal volume and weight, the muscular substance may be diminished; that is, instead of hypertrophy, there is atrophy of the heart.

The several portions of the heart may collectively participate in the enlargement, or it may be confined to one or more of the anatomical divisions, without extending to the whole organ. In the majority of cases, all portions are involved, but they are rarely affected equally; the enlargement is more marked in some divisions than in others. The different portions may predominate in one part and dilatation in another. If the enlargement be limited to, or be seated chiefly in, the left ventricle, the vertical is more increased than the transverse diameter; the heart is elongated, and the conoidal form may be more marked than in health. If the enlargement be great, the right appears to be merely an appendix of the left ventricle. The apex is lowered, and is more or less removed to the left of its normal situation.

On the other hand, if the enlargement be limited to, or be seated chiefly in the right ventricle, the width, more than the length, is increased; the conoidal form is less marked than in health; and the apex, formed in part or entirely by the right ventricle, is blunt instead of pointed. The apex extends lower than in health, and more in a direction toward the epigastrium than when the enlargement is seated in the left ventricle. If both ventricles be considerably enlarged, the organ has a globular form. The papillary muscles are not infrequently more or less increased in size when the ventricular walls are thickened. The degree of hypertrophy varies greatly in different cases. The thickness of the left ventricle may be increased to an inch, an inch and a half, and even two inches. The walls of the other compartments may, in like manner, be doubled, tripled, and quadrupled. The vertical and transverse dimensions may be five or six inches, or more. The weight may exceed two, three, four, and even more than five times the normal average.

Is enlargement by hypertrophy due to an increase in size of the muscular fires, or does it involve an abnormal multiplication of the fibres? If the term hypertrophy be applied exclusively to morbid growth, it implies that the enlargement is due to the former, that is, to an increase in size of the muscular fibres. The term is thus restricted by Virchow and others. The multiplication of fibres, on the other hand, is called hyperplasia, or hypergenesis. Measurements in normal hearts, and in hearts more or less hypertrophied, show an increase of size of the muscular fibres, their diameter in the latter sometimes being four times greater than in the former. The heart may, therefore, be enlarged so that the volume will be four times greater than in health, by hypertrophy, in the restriction sense of the term. This, however, will probably not account for the increase of the muscular substance in all cases; and, if not, the multiplication of fibres must be admitted. Enlargement of the heart by hypertrophy, therefore, may be due wholly to hypernutrition, or increased growth of the muscular fibres, and hyperplasia may be superadded.

What causes the pathological processes, namely, hypernutrition and hyperplasia, which increase the quantity of the muscular substance of the heart?

Generally, if not invariably, enlargement by hypertrophy is the result of prolonged abnormal force of the heart's action. It is difficult to account for this form of enlargement, except as caused by augmented muscular power continued for a long period; and generally there are present obvious causes which account, in this way, for the enlargement. The mechanism is the same as in the familiar examples of certain voluntary muscles becoming disproportionately developed when inordinately exercised. The muscles of the arms of the blacksmith are strikingly in contrast with the muscles of the lower limbs; and the reverse is true of pedestrians and dancers. Involuntary muscles, aside from the heart, also present examples. For instance, the muscular structure of the urinary bladder may become enormously hypertrophied, when the power of contraction of this organ has been for a long time increased in consequence of obstruction to the expulsion of the urine. Clinical observation shows, that in most cases of enlargement of the heart by hypertrophy, there are prior morbid conditions which stand to it in a causative relation. The practical bearing of this pathological view of hypertrophy is vastly important. It follows, that enlargement of the heart by hypertrophy, as a rule, is compensatory; or, in other words, a conservative provision to meet the difficulties incident to the morbid conditions upon which the hypertrophy depends. This truth cannot be too strongly impressed.

In the great majority of cases, enlargement by hypertrophy is consecutive to, and dependent upon, morbid conditions within the heart, namely, on valvular lesions. These give rise to hypertrophy when they involve over-repletion of the cavities, in consequence either of obstruction to the free passage of the blood through the orifices, or of regurgitation due to valvular insufficiency. The organ being unduly distended and stimulated by the accumulation of blood, its action becomes abnormally forcible; the causes of accumulation being permanent, and often progressively increasing, the increased power of action continues and augments, and hypertrophy is the result. The hypertrophy commences in that portion of the heart which is primarily affected, but the several portions sustain to each other, in their anatomical structure and functions, relations so close and reciprocal, that causes which at first are limited to one portion, affect, ultimately, the whole organ. The enlargement, however, preponderates in the portion which is first affected.

Directing attention, with some detail, to the mode in which valvular lesions give rise to enlargement, we shall be led to consider the development of the affection in the different anatomical divisions of the heart, respectively, taking them up in the order of their greater relative liability to become hypertrophied.

Of the several portions, the left ventricle is oftenest enlarged; next in liability to enlargement, is the left auricle; next, the right ventricle; and, last, the right auricle.

The valvular lesions which especially lead to hypertrophy of the left ventricle, are seated at the aortic orifice. Lesions in this situation may involve, as will be seen hereafter, either contraction, and consequently obstruction; or incompetence of the valves, and consequent regurgitation of the blood from the aorta into the ventricular cavity.

Obstruction seated in the aorta, either near to or at some distance from the heart, such as is incident to aortic aneurism, may lead to hypertrophy of the left ventricle primarily, and subsequently of the other portions. Enlargement commences in the left ventricle, in connection with lesions affecting the mitral orifice and valves, and involving either contraction or insufficiency, or both these immediate effects.

Contraction and valvular insufficiency at the orifice of the pulmonary artery occasion, primarily, enlargement of the right ventricle, precisely as aortic lesions induce, first, enlargement of the left ventricle.

Lesions at the tricuspid orifice being extremely infrequent, enlargement of the right auricle rarely occurs, except consecutively to an affection of the right ventricle.

Enlargement of the heart, not associated with valvular lesions, may be due to obstruction at a distance from the centre of the circulation. Obstruction to the pulmonary circulation incident especially to emphysema of the lungs, and occasionally to chronic pleurisy, collapse, and dilated bronchi, leads to enlargement.

The researches of Larcher, Ducrest, and others, show that a certain amount of hypertrophy, limited to the left ventricle, is incident to pregnancy. It would seem that the hypertrophy, under these circumstances, is to be regarded as normal, and that it disappears after confinement.

The changes which occur in the muscular structure of the uterus, in connection with gestation, are thus represented, on a small scale, in the heart. The increase in weight of the heart in pregnancy, it is estimated, may amount to one-fifth of the previous weight of the organ. Doubtless this temporary hypertrophy is compensatory or conservative, as it is when it occurs in other connections.

It was formerly supposed, that the prolonged functional disorder of the heart frequently eventuated in the development of hypertrophy. This supposition does not derive much support from clinical experience. At first view, the statement just made may appear inconsistent with the fact that the abnormal growth of the muscular walls of the heart is the result of abnormal muscular action of the organ. The inconsistency disappears when it is considered that functional palpitation, even when intense, does not involve the increase of power or strength of muscular action which is incident to the over-accumulation of blood from an impediment to the circulation.

(See "Functional Disorders," page 50, where this opinion is controverted. *Hale.*)

Enlargement by hypertrophy, as already stated, is almost always a secondary affection. In the great majority of cases it is consecutive to valvular or aortic lesions. It is also an effect of certain chronic pulmonary diseases, more especially emphysema of the lungs. It occurs in certain cases of Bright's disease. It is a physiological event in pregnancy. It may be produced—but the examples are very rare—by long-persisting functional disorder. Its occurrence, when it is not evidently a secondary affection, is so infrequent, that there is room for doubting whether it ever be a truly idiopathic affection. (Flint.)

SYMPTOMS AND PATHOLOGICAL EFFECTS OF HYPERTROPHY.

The symptoms of hypertrophy, in the cases which come under the cognizance of the physician, are generally intermingled with those of concomitant cardiac or other affections, of which the hypertrophy is an effect. Cases of hypertrophy not associated with, and dependent upon, other affections, are so rare, that its clinical history cannot be said to have been established by observation. The symptomatic phenomena which are described as distinctive of it, are determined inferentially, rather than by facts observed in well-authenticated cases. Rationally considered, it is clear that the symptoms would be those indicative of abnormal power of the heart's action. Undue determination of blood to the head might be expected to occasion certain phenomena, such as cephalalgia, flushing of the face, throbbing, epistaxis, vertigo, etc. These symptoms have relation especially to hypertrophy affecting the left ventricle. Assuming the absence of aortic and of mitral lesions involving obstruction or regurgitation, the pulse would represent by its force, fullness, and incompressibility, the power of the ventricular systole. Dyspnœa, when, from any cause, the action of the heart is increased, as, for example, after exercise, would denote that the hypertrophy affected the right ventricle. Of the powerful action of the heart the patient would be conscious when his attention was directed to it, and it would be apparent from the movements of parts of the body and the dress. The digestive and assimilative functions would not be expected to offer any marked symptoms of disorder. The muscular strength would not be diminished; nutrition would not be impaired; nor the functions of secretion and excretion interrupted. (Flint.)

Hypertrophy of the heart, not consecutive to either valvular or aortic lesions, and not an effect of either emphysema or any other pulmonary disease, constitutes always presumptive evidence of the existence of renal disease.

SUMMARY OF THE PHYSICAL SIGNS OF ENLARGEMENT OF THE HEART.

I cannot do better, in order to bring to your observation in a practical way, the prominent physical signs of enlargement, than to quote from Flint on Diseases of the Heart.

1. Percussion.—The area of the superficial cardiac region extended beyond the range of healthy variation. The degree of dullness within this area greater than in health, and the sense of resistance more marked. The limits of the deep cardiac region—in other words, the boundaries of the heart—generally defined by careful percussion; the dimensions of the space which the heart occupies being thus ascertained with precision, and the form of the organ delineated on the chest. Enlargement of the right or left auricle, sometimes determined by the extent of the area of dullness at the base of the heart, on the right or left side of the sternum.

2. Palpation.—The apex-beat moved to the left of its normal position, and lowered; the extent of variation, in either respect, being proportionate to the degree of enlargement, provided extrinsic causes be excluded. The area within which the apex-beat is felt extended beyond the range of health. Abnormal impulses felt in two, three, or more intercostal spaces, the additional impulses either synchronous or alternating with the apex-beat, in some instances referable to the auricles, although due to the ventricular systole; and, when felt in the epigastrium, due to the action of the right ventricle.

3. Auscultation.—The respiratory murmur not appreciable within the superficial cardiac region in tranquil breathing, and sometimes wanting when the breathing is forced; feeble over a larger area within the præcordia than in health. The boundaries of the heart defined by abrupt cessation or notable diminution of vocal resonance, and the augmented space which the organ occupies, in this way determinable in corroboration of the evidence afforded by percussion.

4. Inspection.—Abnormal projection of the præcordial region in some cases; the projection considerable if the enlargement take place in early life. The movements of impulsion determined, which are also ascertained by palpation; movements sometimes seen which are not perceptible to the touch, especially movements which commence by depression with the systole of the ventricles. Alternate movements of intercostal spaces often apparent to the eye, which are imperfectly ascertained by palpation.

5. Mensuration.—Prominence of the præcordia greater than the corresponding portion of the chest on the right side; in some cases apparent on inspection, but determined with precision by diametrical measurement. Mensuration also employed in determining with accuracy the dimensions of the superficial and deep cardiac regions, the position of the apex-beat relatively to the nipple, median line, etc.

SUMMARY OF PHYSICAL SIGNS DISTINCTIVE OF ENLARGEMENT BY HYPERTROPHY.

1. *Palpation.*—Abnormal force of the apex-beat, denoting not merely excited action of the heart, but augmented power of the systole of the left ventricle, the impulsion prolonged and strong. A strong impulse in the epigastrium in cases of hypertrophy of the right ventricle; the impulsions sometimes communicated to the lower part of the sternum, and extending more or less over the site of the liver. A strong, heaving movement of the præcordia, in distinction from the shock, more or less violent, due merely to augmented functional activity of the ventricles.

2. *Auscultation.*—Increased intensity of the aortic second sound, and especially of the element of impulsion of the first sound, in hypertrophy of the left ventricle, rendering the first sound dull and prolonged, as well as abnormally intense, Exaggerated intensity of the pulmonary second sound, in hypertrophy of the right ventricle, especially if associated with obstruction to the pulmonary circulation. Augmentation of the tricuspid valvular element of the first sound in some cases of hypertrophy of the right ventricle.

TREATMENT.

The treatment of hypertrophy of the heart, *i. e.*, enlargement by hypertrophy, by the allopathic school, presents some of the strongest arguments against the wilful bigotry of that school, and their persistence in adhering to a routine treatment, even when the facts of pathology are against them.

Up to a recent date, the allopathic treatment universally adopted, was equalled only by that of Dr. Sangrado, as depicted in Gil Blas. Repeated venesections; a diet so low as to result in partial starvation, was insisted on, not only by Vausalva and Albertini, but more recently, by Hope, Bouillard, and even Wood.

I do not know of any disease where the results of such treatment could be more destructive to the integrity of the general system, for by it the heart was weakened, and *dilatation* — a condition ten-fold worse than *enlargement* — was generally caused.

The very *object* of the allopathic treatment was an error. A diminution of the *size* of the heart was considered a desirable result, but, as Flint observes, "A better understanding of the pathological relations of hypertrophy leads to the conclusion, that therapeutical measures designed to diminish or prevent it, are likely to do harm, in so far as they have efficiency in promoting these ends."

I am sorry to inform you, that the homœopathic treatment of hypertrophy of the heart has been as erroneous in principle, although the results have not been nearly as disastrous as those produced by the opposite school. The same remedies, in the same potency, have been used for the two opposite conditions of enlargement and dilatation. Even Baehr, otherwise sound, gives no separate and distinctive treatment for the two diseases.

I propose to present you with the treatment of *enlargement by hypertrophy*, and in a future lecture give you the true treatment of *dilatation*.

At present, the best authorities of both schools agree on one vital point, namely, that, considered in connection with the antecedent morbid conditions which give rise to it, conditions involving impediment to the circulation, hypertrophy, so far from being an evil, is an important provision against the dangers incident to the accumulation of blood within the cavities of the heart, and against the evils of dilatation. Hypertrophy compensates for the disturbance of the circulation caused by valvular lesions, and so long as the enlargement consists of this compensating increase of muscular structure, and consequently of muscular power, the patient experiences little or no inconvenience, providing nothing occurs, like anæmia, for example, to weaken the force of the heart's action. It is when hypertrophy has reached the limit of its progress, and dilatation has followed, that serious inconveniences, referable to the heart and circulation, begin to be felt.

The general indications for treatment which I will now give for your adoption are:

1. To prevent those impediments to the circulation, arising generally from valvular lesions, which give rise to hypertrophy.
2. To prevent dilatation, by keeping up, if possible, the normal tonicity of the muscular structure of the heart.
3. To quiet undue excitement and irregular action of the heart.

The rules in relation to the general management of the patient are so uniformly agreed upon by all writers, that nothing original can be said. Baehr and Flint, the two representative authorities, have nearly the same views.

It is obvious that all influences that might stimulate the already over-excited heart should be avoided. Coffee, spirits, strong spices, salt in excess, also fat food, should be avoided. Mental excitement, especially anger, should be guarded against by the patient.

Very large and hearty meals should be avoided; small and frequent meals should be advised, and on no account should heavy meals late at night be allowed. The occupation of the patient may sometimes be changed to advantage. A sedentary life, attended by much excitement of mind, should be changed to a more active one, with less mental irritation. As regards exercise, your own judgment will have to be depended on. In some cases, general exercise, unless moderate, must be prohibited; in others, the physical activity may be greater. Local coldness of the hands and feet must be met with such gymnastics as exercise the extremities alone, the body being quiet.

The circulation should be equalized as much as possible; especially should remote parts of the body be supplied with blood, in order that the heart may not be overburdened and excited. The extremities should be warmly clad, and the whole body protected by flannel underclothing.

All influences tending to debility, nervous prostration, anæmia, or blood-impoverishment, should be avoided. Remember that the main object of treatment is to prevent *weakness* of the heart. Losses of the fluids of the body in excess tend to such weakness. Excessive venery, undue lactation, diarrhœa, purgation, a too meagre diet, and the improper use of medicines, should be guarded against. Mental depression will have the same unhappy result, and you should strive to have your patients placed under those influences which conduce to a happy, pleasant state of mind.

The medicines indicated for hypertrophy with enlargement are best presented in four classes, arranged according to their peculiar spheres of action, thus:

I. Those medicines whose primary effect in large doses is to depress the action of the heart and weaken its muscular power, namely:

Aconite, gelseminum, veratrum viride, veratrum album, kalmia, tartar emetic, colchicum, sanguinaria, lobelia, and tabacum.

II. Medicines whose primary effect is to increase the strength of the muscular power of the heart, by stimulating its nervous life; and whose secondary effect is to depress and paralyze the nervous and muscular power of that organ. Among the most prominent of this class are:

Digitalis, *cactus*, *lilium*, *hydrocyanic acid*, *prunus virginiana*, *amygdalus, and A. amara*, *persica*, *lycopus virginica*, and *laurocerasus.*

III. Remedies which primarily tend to increase the nervous power and nutrition of the heart; and secondarily, to weaken and paralyze the same cardiac functions, namely:

Nux vomica, *ignatia*, *hydrastis*, *collinsonia*, *cinchona*, *ferrum*, *cimicifuga*, *helonias*, *phosphorus*, and *sulphuric acid.*

IV. Certain antipsoric or alterative remedies, whose effects cannot be classified into primary and secondary sequences, namely:

Spigelia, *rhus*, *iodine*, *graphites*, *natrum mur.*, *bismuth*, *lycopodium*, and *sulphur*.

INDICATIONS FOR THE REMEDIES IN CLASS I.

In selecting a remedy for the symptomatic or pathological results of this form of enlargement, you should first assure yourself that the *force* of the heart is actually increased. Remember that the heart may be in excessive *action*, without having increased *force*.

If the hypertróphy occur in robust, strong, full-blooded persons, with bright complexion, disposition to changes of color of the face, glistening eyes, injected conjunctiva, headache, stinging pains in the region of the heart, *aconite* is the remedy, and should be given in the lowest dilutions, and frequently repeated, until an amelioration occurs, when the medicine should be withdrawn. Remember that these symptoms are like the *secondary* effects of *aconite*, and this obliges us to prescribe it in more material doses. All of Class I. follow this law, and if indicated by the increased *force* of the heart's action, and the general symptoms correspond, the dose should be the same as *aconite.*

Veratrum viride is indicated by the more forcible impulse of the heart, the stronger pulse, and the greater congestion of the head and chest.

Gelseminum, by the same symptoms, but in a less degree, and an apparent torpor of the functions of the brain and lungs, and a less active congestion.

Veratrum album, according to Ch. Muller, causes "Extreme agony, which takes away the breath; palpitations, with anxiety, and quick audible respirations; paroxysms of agony about the heart, which beats very violently, and feels as if it were too warm; violent beating of the heart, which forces up the ribs; the heart beats up very high and forcibly, so as to force the hand away, without pain." He remarks that "the entire absence of pain about the heart, while it beats so violently as to shake the chest, elevate the ribs, and lift the hand of the auscultator, deserves particular attention, for this almost never occurs, except in hypertrophy with dilatation." (?) (He should have said with *enlargement*, for in dilatation no such forcible impulse is present.)

"*Physical signs*." The percussion sound may be dull over a very large space, (the apex of the heart may beat directly beneath, outside of, or above the nipple,) bulging of the ribs over the heart; action of the heart visibly very violent; sounds of the heart very loud and clear, or else one or both sounds accompanied with abnormal murmurs."

If *veratrum alb.* causes this array of symptoms—and it appears to me that the primary and secondary are mixed in the above—the increased impulse or force of the heart's action must be a secondary effect, for the immediate effects of *white hellebore* are marked depression of the heart's action, even to pulselessness. If this medicine is given for concentric hypertrophy, it must be given in the same doses as advised for *aconite* and others of its class.

Kalmia may be useful in certain cases, but the indications are not yet certain.

Tartar emetic should be resorted to if pulmonary engorgement is feared, and there is at the same time hepatic congestion, dyspnœa, cough, etc.

Colchicum, if the urine is scanty, red, and deposits a brick-dust sediment, and the heart's action is excessive and strong.

Sanguinaria will prove a potent remedy if the hypertrophy is complicated with suppressed or scanty menses, congestion of the lungs, cough, dyspnœa, and sometimes congestive cephalalgia.

Lobelia should not be forgotten when there are *asthmatic* symptoms with the enlargement.

Tabacum is secondarily homœopathic to hypertrophy, and Baehr advises smoking small cigarettes for palliative relief of the excessive palpitations. If they are marked by increased impulse, tobacco may be used occasionally; if the impulse is weak it should be prohibited.

In regard to the administration of these remedies, I wish to impress upon your minds this important fact, namely, that if you wish to get *permanent* curative effects from any remedy in hypertrophy, you must continue its use for days and even weeks. If you have selected *aconite* as the appropriate medicine, do not supplant it for some other in a few days because you do not see an improvement in the action of the heart. Our doses do not rapidly depress the excessive cardiac action, therefore the physiological or normal action which we wish to induce does not come suddenly.

As a general rule, the remedies above named may be given every three or six hours, according to the severity of the case, and always in the lowest potencies, and sometimes the mother tincture.

INDICATIONS FOR THE MEDICINES IN CLASS II.

Of all the medicines in this class, the *digitalis purpurea* is the most important, but even to this day its true method of action is not understood by a portion of the profession, who persist in believing it to be a primarily depressing medicine. Those of you who have read my paper on *digitalis*, published in the *United States Medical and Surgical Journal*, and reprinted in pamphlet form, need not be told that many years ago I adopted the views of Prof. Tully, who was far ahead of his time in his estimate of some medicines. Within a few years, Handfield Jones, Hammond, and others have adopted the same view of its action.

Digitalis, when given in medicinal doses, causes pathogenetically a condition similar in effect to hypertrophy with enlargement of the heart. It does not cause actual enlargement, but such a hyper-stimulation of the heart that the results are similar.

When death occurs from acute poisoning by *digitalis*, the muscular substance is hard and firm; the heart is rigidly contracted, and no blood is found in its cavities. Now, if death should suddenly occur from concentric hypertrophy or enlargement, the heart would be found in the same condition as in *digitalis*-poisoning.

It is obvious that if we accept this as the true action of *digitalis*, namely, that it is, in large doses, a cardiac tonic, you can readily understand how injurious, and even dangerous, it would be to give large doses in hypertrophy with enlargement, *i. e.*, when the heart has already an excess of muscular power. It is in such cases that, when given by the old school, dangerous and alarming symptoms occurred, which led to the fears of its use which we find so prevalent. It is as if an allopath were to give a massive dose of *belladonna* in a case of cerebritis, or *nux vomica* in spinal congestion, or *arsenic* in gastritis. In such cases, the remedy being intensely homœopathic, a severe or fatal aggravation would occur.

The deduction I would have you draw from this is, that as *digitalis* is primarily and intensely homœopathic to a condition similar to hypertrophy with enlargement, in which the contractile power and impulsive force of the heart is increased, it should be prescribed in the smallest dose consistent with reason. I will explain what I mean: the 3rd of *digitalis* may not be *stronger* in reality than the 30th of *lycopodium*, for while the former appears to lose its medicinal power after the 3rd, the latter seems to gain in power at every remove upwards from the 3rd trituration. This difference is due to the fact that certain medicines have different qualities of inherent power; and, in the future, it should be the aim of our school to ascertain the inherent medicinal power of each drug, instead of quarreling about the dose.

The dose of *digitalis*, then, in this disease, should lie in the first three dilutions of the tincture, or the triturations of *digitaline* from the 3rd to the 6th. With these doses, repeated every few hours, or as often as every hour, no aggravation, but much benefit, will be derived.

Cactus grandiflorus is an analogue of *digitalis*, and not of *aconite*, as some suppose. If you will look at the provings you will see that the evident primary symptoms are those of hyper-stimulation of the heart, even to spasmodic contraction of its muscular tissues. What else can that characteristic symptom, "constriction in the chest and in the heart, as if from an iron hand," mean? The general symptoms of *cactus* all tend in this direction, for it causes 'constriction' everywhere. I have carefully analyzed the clinical cases wherein *cactus* has proved curative, and am convinced that in those cases where the high dilutions were beneficial, there was present a condition of increased tonicity of the heart; in other words, the palpitations and so-called congestions of the heart were due to cardiac hyper-stimulation. In cases of true hypertrophy, then, do not use *cactus* lower than the 6th decimal dilution. Lower than this I have found it to aggravate all cases where the impulse of the heart was *too strong*.

Lilium is, according to its recent provings, a very near analogue of *cactus*.

Acidum hydrocyanicum is another remedy closely allied to *digitalis*. In proof of this, I have but to cite you to Dr. Handfield Jones' experiments. He says, "In poisonous doses it produces tetanic convulsions, preceded by faintness and giddiness. After death the heart is well and firmly contracted, its tissue remarkably firm, the cavity of the left ventricle almost quite obliterated, that of right small, but little blood in either, coagula in both auricles." Stille says, "the whole venous system is gorged and distended with dark uncoagulated blood," which implies that, owing to the tetanic contractions of the heart, the circulation was suspended. I consider this remedy useful in high potencies to quell the excessively forcible action, pain like angina pectoris, and for other symptoms found in its pathogenesis. Use the 6th or 30th centennial dilution.

There are many agents, chemical and vegetable, which contain *hydrocyanic acid* in appreciable quantities. These all have, in a less degree, the same specific action on the heart and its nervous supply. The most potent of these is the

Cyanide of potassium, which may be used in the 6th or 30th potency for similar symptoms and conditions.

Laurocerasus is another which possesses many notable and important heart symptoms.

Prunus virginiana (wild cherry) and *amygdalus persica* (peach) both contain *acidum hydrocyanicum*, and have long been used to quiet and regulate abnormal action of the heart. Their use, in infusion of the bark, has doubtless been injurious in hypertrophy with enlargement, but in the 2nd or 3rd dilution would no doubt be beneficial.

*Lycopus virginicus** possesses powers closely allied to the above medicines. In the dilutions below the 3rd you will find it beneficial in hypertrophy with a tendency to, or actual hæmoptysis and cough.

Amygdala amara (bitter almonds) contain *hydrocyanic acid.* I have known patients troubled with palpitations from hypertrophy get considerable relief from eating two or three after each meal.

Repetition of medicines. If you have carefully selected one of the above for the case you are treating, give it a fair trial. Do not change the medicine unless the symptoms materially change, but continue its use for days and perhaps weeks. The repetition of the dose will depend on the amount of cardiac disturbance. Four doses a day, unless frequent palpitations or severe congestions occur, in which cases the medicine may be repeated every hour or two.

The remedies of the third class, namely: *nux vomica, ignatia, cinchona, ferrum, hydrastis, collinsonia*, and *sulphuric acid*, do not differ very widely, in their ultimate effects on the heart, from those of Class II. Both classes primarily increase the innervation and tonicity of the heart, by acting through different channels. *Nux vomica* acts through the cerebro-spinal nerve-centres, while *digitalis* operates through the great sympathetic.

I will now give you the indications for this class:

Nux vomica, I assure you, has not been sufficiently appreciated in hypertrophy of the heart. It is indicated in the concentric and eccentric form. But it is of the former only that I will now speak.

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* **New Remedies. 2nd Edition.**

Dr. Ch. Müller* says of this medicine, "It causes palpitation in frequent short paroxysms, with commotion of blood; pulsating throbs in the direction of the heart; great anxiety, with severe palpitation. In the numerous and careful *post-mortem* examinations which have been made in cases of poisoning with *nux*, no organic alterations about the heart have been found. Its influence on the heart must be referred to the nervous system. It causes increased activity and evident irritation of the ganglionic system, which may be propagated to the mind and senses; hence the above-mentioned heart-symptoms may arise in consequence of sympathy with the ganglionic and mental affections. For this reason Hahnemann laid so much stress on the presence of vexability, over-sensitiveness to all impressions, hypochondriacal humor, passionate irritability and sudden choler, great anxiousness, starting in affright, fearful, anxious dreams, etc., as strong indications for the use of *nux vomica.* Hence, *nux* cannot prove homœopathic to any heart affection dependent upon any organic or material change of structure."

I cannot agree with Dr. Müller in his estimate of this medicine. Because no structural change was found in the heart from acute nux-poisoning, it does not prove that hypertrophy may not be caused by its long-continued pathogenetic effects. You will remember that hypertrophy is rarely a primary disease. It is generally brought on from obstructions somewhere else, in the circulation, or in important organs. That the chronic poisonous effects of *nux vomica* on the liver, intestinal canal, and spinal cord, will cause hypertrophy, I have no doubt. It will not cause, directly, the thickening or thinning of the heart-walls, but it will cause disorders which lead to that result.

The translator of Dr. Müller's paper says, "*Nux vomica* acts predominantly and specifically on the motor side of the spinal marrow and the muscular system in general, and tends more particularly to cause tetanic spasms; as the heart is a very muscular organ it is probable that it exerts a similar action on it; in fact, the spasm of the heart may become so complete and persistent, that this organ remains tightly contracted for some time, during which little or no impulse is felt, the respiration being difficult and the pulse extinct. If the spasm of the heart be less complete and tonic, *i. e.*, more atonic, then violent palpitation may ensue. But *nux vomica* constantly tends to produce long-continued spasmodic contraction of the heart. According to Sorbenheim it often causes an axphyxic condition, dependent upon an extremely violent contraction of the respiratory muscles and heart. Every one familiar with diseases of the heart must be familiar with this state of things: a patient with organic disease of the heart will be suddenly taken with what he calls spasms; he sits in speechless agony, his hands clasped over the cardiac region, his eyes protruded, his face livid; the physician attempts to feel the pulse and can scarcely find it; he places his hand or ear over the heart, and finds everything still and motionless as death itself; after a while the spasm relaxes; more or less palpitation follows, and the patient recovers for the time. Such attacks are often mistaken for paralysis, exhaustion, or debility of the heart, and treated with stimulants."

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* Homœopathic Examiner, Vol. V.

This writer asserts that *nux* is homœopathic to enlargement of the heart with thickening of its walls, which assertion I accept, but only as relates to its primary effect, for the secondary effects of the above-described action of *nux* will just as certainly be dilatation of the heart, with atony of its remaining muscular fibres, even to paralysis.

You will doubtless read some authorities, who, like the writer I have quoted, will assert that the action of *digitalis* is opposite to that of *nux*. This is not the case, unless the statement is qualified. The primary action of both is very similar, so is the resulting secondary effect. It might be said that the secondary effect of *digitalis* was the opposite of the primary action of *nux; such* an assertion would be correct.

Nux vomica, therefore, is indicated for simple hypertrophy, *i. e.*, when the walls of the heart are thickened, the cavity retaining its natural dimensions; also in that variety of hypertrophy in which the walls are considerably thickened, and the cavity dilated; and in hypertrophy with contraction, in which the walls are thickened and the cavity diminished in size. But, before you venture to prescribe *nux vomica*, be sure of your diagnosis, for if you give it in too large doses in the above conditions, you will surely get severe aggravations, and injure your patient, because they are conditions simulating the primary effects of *nux*, and calling for the highest attenuations, namely, from the 12th to the 200th, or even higher.

Ignatia is indicated for the same pathological conditions as *nux vomica*, but the selection must depend on the mental symptoms and the sex of the patient. *Ignatia* is more suited to women, or men with feminine dispositions, to patients who weep easily, or laugh and cry alternately; in other words, persons of hysterical temperament; and for hypertrophy when caused by the remote effects of grief, care, or other mental trouble. Prescribe the higher attenuations, not too often repeated. (*Nux* and *ignatia* are also homœopathic to hypertrophy with dilatation and attenuation of the heart-walls, but of this I will speak in my next lecture.)

China, or *cinchona*, has not been used by the homœopathic school to any extent in diseases of the heart, yet I consider its action analogous to that of *digitalis* and *nux*, or as holding an intermediate relation to them. Hahnemann's observation that in cases of poisoning from *digitalis*, *china* causes terrible anxiety and aggravation, is one of the best proofs that, in their primary action on the heart, they act similarly.

The following symptoms from the Materia Medica Pura will remind you of the symptoms of *nux* and *digitalis:*

"Palpitation of the heart, also with rush of blood to the head, and heat and redness of the face, with cold hands."

"Strong, violent beats of the heart, also with anxiety, also with feeble pulse and cold skin."

"Pressure in the region of the chest (heart), particularly when the trunk is bent forward, when sitting or standing, also with anguish and oppression of breathing."

In the proving of *quinine* you will find similar symptoms, to which I add the following: "distressing constriction about the throat, and sense of *fear* about the heart;" and, if you should happen to practice in malarious districts, where people are poisoned with *quinine*, you will have excellent opportunities of observing its effects, namely: its primary symptoms, like those I have just quoted, denoting over-stimulation of the heart; and its secondary effects, namely, weakness, irritability, and irregular action of the heart. I have no hesitation in asserting, that many of the cases of hypertrophic debility of the heart, supposed to arise from ague, have their origin in the enormous quantities of *quinine* given to suppress that disease.

I believe, also, that the free use of *quinine* will cause hypertrophy with enlargement, of a *temporary* character, and as a large proportion of the cases of dilatation of the heart is preceded by this condition, we have in *quinine* a medicine which is homœopathic to that variety of cardiac disease. I shall refer to china again in the next lecture.

Dose: In hypertrophy with enlargement, having the above symptoms, give the 6th or 30th dilution.

Ferrum has an action not so far removed from *nux* and *china* as some have supposed. All the preparations of iron cause pathogenetically a pseudo-plethora, *i. e.*, a plethora not of a healthy physiological character. I do not look upon iron merely as a blood-enricher, acting in the same way as beef or other blood-food. To suppose that it acts simply by imparting *iron* to the blood is too crude a notion. The more rational theory is that it has a two-fold action, namely, of entering the blood and then stimulating the nerves of nutrition until the blood-making process goes on in a normal manner. This ferrum-plethora closely simulates that condition which we sometimes see in cases of hypertrophy with enlargement. The *symptoms* indicating its use are: Rush of blood to the head, with puffiness around the eyes and swelling of the veins; vertigo, staggering, hammering and throbbing headache, and roaring in the head; faint feeling in walking, with blackness before the eyes; hard, strong beating of the heart; pulse hard, large, and slow, or quickened by exertion; heat, with anxiety and oppression, proceeding from the pit of the stomach; tightness in the chest, as if constricted, with difficult, anxious breathing, and contractive spasm of the heart. For these symptoms never give *ferrum*, but not lower than the 6th trituration.

Hydrastis has no special heart-symptoms, but I recommend it, on theoretical grounds, when the hypertrophy is impending from obstructions in the liver, or chronic stagnation of the portal circulation. *Podophyllum*,* *leptandra*, *æsculus*, and *collinsonia* have the same action, and are especially indicated if the patient is subject to hæmorrhoids, and when the cardiac symptoms are worse when the piles are least troublesome.

The medicines of the *fourth* class, namely: *belladonna*, *glonoine*, *lachnanthes*, *stramonium*, *agaricus*, *cimicifuga*, *aurum*, and *solanum*† are all excellent palliatives in hypertrophy, when the impulse is so strong as to throw an undue amount of blood to the head and lungs, causing headache, vertigo, frightful dreams, etc. They have the best effects in the 3rd to 6th dilution.

Plumbum aceticum, according to Raue, is homœopathic to true hypertrophy with the symptoms: "Stitch in the region of the heart during inspiration, with anxiety; heat and redness of the face; rush of blood to the region of the heart during a rapid walk; anguish about the heart, with cold sweat; palpitation. *Post-mortem* after poisoning has shown, that the serous coat of the pericardium is lined with a layer of reddish grey, fine, villous, meshy, firm, exuded lymph. *The heart is more than double its natural size. The wall of the left ventricle is more than an inch thick.*" ‡

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* See Symptoms of *Podoph.* in New Remedies.

† U. S. Jour. of Hom., 1870.

‡ Raue's Pathology.

LECTURE VIII.

ENLARGEMENT BY DILATATION.

Definition of Enlargement by Dilatation — Symptoms — Pathological Effects — Physical Signs and Diagnosis — Summary — Treatment.

GENTLEMEN: In this lecture, a condition of the heart nearly the opposite of that described in the last, namely, enlargement by dilatation, will be considered. I shall quote entire Flint's admirable description, because no words of mine could make it plainer. The treatment, however, is purely homœopathic — not theoretical, but based on experience.

"Under this head are embraced, in addition to the rare cases of pure or simple dilatation, that is, those in which the capacity of the cavities is increased and the walls attenuated, all cases in which dilatation co-exists with, but predominates over hypertrophy. Of the two kinds of enlargement, this is by far the most frequently found after death when organic disease of the heart proves fatal. In the cases in which the heart attains to a very large size, dilatation almost invariably preponderates. The cases in which the organ, from its immense bulk, resembles a bullock's heart (*cor bovinum*) are those in which there exists great hypertrophy, with still greater dilatation. The degree of dilatation varies greatly in different cases, and the hypertrophy combined with it is also variable. The preponderance of dilatation, when the heart is examined after death, is generally sufficiently evident on inspection. The abnormal increase in the dimensions of the organ exceeds that of the weight. The ventricular walls collapse, and the organ, resting on its posterior surface, is flattened, instead of preserving a globular form, as when hypertrophy predominates. The greater increase in width than in length, is marked in proportion to the preponderance of dilatation. Owing to this, the organ becomes wedge-shaped, and sometimes presents nearly a square form.

"The mechanism of dilatation is quite different from that of hypertrophy. In the production of the latter the process is vital, whereas in the former it is mechanical. Hypertrophy is a consequence of over-nutrition; dilatation is the result of the yielding of the walls of the heart to a distending force, the condition, however, which stands immediately in a causative relation to both is the same, viz., undue accumulation of blood within the cavities of the heart; hence it is that both take place either conjointly or in succession, so that hypertrophy and dilatation are very often associated. Dilatation, thus, not less than hypertrophy, depends on antecedent affections which occasion impediment to the circulation through the vessels or the orifices of the heart, leading to over-accumulation of blood within the cavities. These antecedent affections are the same as in cases of predominant hypertrophy; and the several portions of the heart become affected singly and in succession, as in the latter form of enlargement. It is not necessary, therefore, in this connection, to consider the dilatation of these portions, respectively, in relation to the particular lesions of the valves and orifices and vessels on which dilatation and hypertrophy alike depend. Moreover, both dilatation and hypertrophy of the different portions of the heart will be referred to hereafter in treating of valvular lesions. It will suffice to inquire into the circumstances which determine the occurrence of dilatation in the place of, or, as is generally the case, in addition to, hypertrophy.

"The first effect of an undue accumulation of blood in the cavities of the heart, continued for a sufficient period, is increased power of muscular action and consequent hypertrophy in the great majority of cases. The hypertrophy is more or less progressive, but it has its limit. The abnormal growth of the muscular tissue ceases after it has progressed to a certain extent. But the morbid conditions inducing over-repletion of the cavities still remain, impeding more and more the circulation. The compensating increase of the muscular tissue no longer taking place, the walls of the cavities yield to the mechanical force of distension, and the progressive enlargement from this time onward is due to dilatation. The limit of hypertrophic enlargement varies in different persons. If the hypertrophy progress until the muscular walls attain to a great thickness, and life continue for a long period afterward, dilatation finally predominates, and the result is an enormous enlargement of the heart, a *cor bovinum*. But dilatation may commence after moderate or slight hypertrophy has taken place; in other words, the hypertrophy ceases after a smaller amount of muscular growth, and dilatation commences. Dilatation may even commence without any previous hypertrophy, and the result is, then, enlargement with attenuated walls, or simple dilatation, a rare variety of enlargement of the heart. The occurrence of dilatation is determined by the state of the muscular walls. Functional debility of the organ, and, still more, changes in the muscular fibres, prevent that vigorous activity which induces abnormal growth; and yielding of the walls takes place early, in proportion as the vital power of resistance is impaired. Anæmia, the feebleness consequent on pericarditis and adherent pericardium, fatty degeneration, softening, and any changes which compromise the muscular power of the organ, tend to abridge hypertrophy and favor dilatation. The latter will therefore predominate in proportion as the condition of the walls is such that they early and readily yield to the distension caused by the accumulation of blood within the cavities. After this brief consideration of the circumstances determining the occurrence of dilatation, in addition to the incidental remarks already made under the head of enlargement by hypertrophy, the reader will be able to trace the relations of dilatation affecting the different cavities of the heart, to lesions of the mitral and the aortic orifice, involving either obstruction or regurgitation, or both, and to obstructions affecting the pulmonary and systemic arterial systems at situations more or less remote from the heart, without recapitulation of the account already given in connection with hypertrophy. The inquiry arises, Does not the heart, in some instances, become dilated in consequence of inherent weakness, no antecedent affections existing to occasion impediment to the circulation? It is probable that this sometimes occurs as an effect of fatty degeneration, pericardial adhesions, atrophy or softening of the muscular fibres, etc. Examples are found of dilatation associated with these structural changes, and without other obvious sources of impediment to the circulation. These changes may be subsequent to dilatation, but it is reasonable to suppose that in some instances they precede and give rise to it. Clinical observation, however, furnishes no evidence that functional weakness alone leads to dilatation, irrespective of structural changes of the walls of the heart, or lesions of some kind which occasion impediment to the circulation. Dr. W. T. Gairdner accounts for dilatation of the heart in cases of pulmonary emphysema, in the same way that he accounts for emphysema, namely, the cavities of the heart are dilated by the force of inspiration, as are the unobstructed air-cells in consequence of collapse of more or less of the pulmonary lobules. This author accounts in this way for, not only dilatation, but hypertrophy, the expansion of the thorax tending constantly to overload the heart, and thus occasioning increased muscular force. Without adopting this explanation, it must be admitted that Dr. Gairdner bases his explanation on facts which have considerable weight. "Of 24 cases of enlargement without valvular lesions, in 21 cases there were manifest and extensive old atrophic lesions of the lungs, with or without accompanying emphysema, which is recorded as having existed in 17 of the cases." Dr. Gairdner also shows, by an analysis of fatal cases, that enlargement of the heart occurs oftener in emphysematous cases than in mixed cases, the proportion being as 15 to 23 per cent.; and that, of the cases occurring with emphysema, valvular lesions are present in a less proportion than in the mixed cases, the whole number of cases analyzed being 84. To show that contraction of the capillaries of the lungs from any cause, or obstructed circulation through these organs, will not give rise to enlargement of the heart, he analyzes 18 cases, in which effusion into the pleuræ or peritoneum, or other causes, occasioned compression of the lungs for a considerable time, there being no valvular lesions. In only four of these cases did enlargement exist, and in one case its existence was doubtful. On these data he bases the conclusion, that, while diseases of the lungs which merely obstruct or obliterate the circulation in the capillaries, have no well-marked tendency to be associated with enlargement of the heart, those which produce atrophy of the pulmonary tissue, and secondarily emphysema, have an obvious influence on the heart, and frequently cause its enlargement.

SYMPTOMS AND PATHOLOGICAL EFFECTS OF DILATATION.

"The *symptoms* due to dilatation, like those of hypertrophy, are generally involved with those incident to valvular or other concomitant lesions. In proportion to the amount of dilatation, the muscular power of the heart is impaired. The symptoms distinctive of dilatation proceed from feebleness and incompleteness of the heart's action. The action of the heart is often irregular, as represented by irregularity of the pulse and of the apex-beats. Both are abnormally feeble. The pulse may be unequal as well as irregular. These symptoms are in relation to dilatation of the left ventricle. The patient experiences more or less uneasiness and undefinable distress, referable to the præcordia, but he is not conscious of that powerful action of the heart which characterizes hypertrophy. The extremities and surface of the body are cool. Lividity may be apparent on the prolabia, the tongue, face, and extremities. The veins, especially those of the neck, may be distended. These symptoms are more or less marked, in proportion as the dilatation affects the right ventricle. Dyspnœa will be prominent in proportion as the right ventricle is the seat of dilatation. The recumbent posture, with the head low, may be insupportable, and, in an advanced stage, the suffering from defective hæmatosis may amount to orthopnœa. Occurring in paroxysms, this difficulty of respiration has been called cardiac asthma. Exercise and mental excitement augment the symptoms, particularly the dyspnœa. More or less cough is usually present, with serous and sometimes sanguinolent expectoration. The abdominal viscera, as well as the lungs, are in a state of passive congestion. Owing to this state, the liver may become more or less enlarged, and may be found to augment rapidly in size when, from any cause, the circulation is temporarily embarrassed in an unusual degree, resuming its former dimensions when the paroxysm ends and the heart recovers its habitual strength.* The digestive functions are weakened, but nutrition may be sufficiently active; patients do not always emaciate. The urine is not abundant, and may be found slightly albuminous, which is due to renal congestion, and is not necessarily indicative of structural disease of the kidneys. Renal disease is, however, associated, in a certain proportion of cases, with dilatation as with hypertrophy. Finally, œdema occurs, first manifested in the lower extremities, thence extending over the body, and effusion into the serous cavities succeeds, constituting general dropsy.

"This is an enumeration of the more important of the symptoms belonging to cases of enlargement in which dilatation predominates, but it is to be borne in mind that, in general, valvular or other lesions co-exist, which, after inducing more or less hypertrophy, have at length led to dilatation; and, under these circumstances, it is difficult to say to what extent the symptoms distinctive of this stage of the disease may not be due to the causes of the dilatation, in other words, to the concomitant lesions. But it is certain that much, if not chief importance is to be attached to the dilatation in the production of the symptomatic phenomena which have been mentioned.

"The *pathological effects* of dilatation are, in a great measure, embraced in the foregoing account of the symptoms. The dilatation is the result of weakness of the cardiac walls, together with an accumulation of blood within the cavities; and, on the other hand, it is the cause of further diminution of the power of the heart's action, and consequent over-repletion. It has, therefore, an intrinsic tendency to increase. The evils incident to enlargement are mostly referable to dilatation. Little or no inconvenience is felt so long as the heart is hypertrophied, and the capacity of its cavities not increased. But in proportion as the latter takes place, the quantity of blood to be propelled from the cavities is greater, and the ability of the muscular walls to contract sufficiently is lessened; hence, inadequacy of the motive power of the central organ to carry on the circulation. This inadequacy increases in more than an arithmetical ratio as the dilatation progresses. The immediate effect on the vascular system is passive congestion, arising, not alone from the defective propelling power of the heart, but from the obstacle presented to the return of blood to this organ by the accumulation within its cavities. The ulterior effects dependent on congestion are: embarrassment of the functions of the important organs of the body; serous transudation, or dropsy; and, occasionally, hæmorrhage. An occasional effect of great dilatation, conjoined with extreme feebleness of the heart's action, is the formation of coagula within the cavities of the heart. There is reason to believe, that in some instances in which the accumulation is excessive, and the contraction of the walls extremely feeble, the blood coagulates during life, and proves the immediate cause of a fatal termination. An unusual accumulation of blood, from any cause, in either the right or the left ventricle, when it is much weakened by dilatation, may occasion paralysis of the walls by distension, and thus produce sudden death.

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* Stokes on the Heart and Aorta.

PHYSICAL SIGNS DISTINCTIVE OF ENLARGEMENT BY DILATATION.

"The physical signs of enlargement of the heart have been already fully considered. The signs distinctive of dilatation are now to be noticed. The several methods of exploration which furnish evidence of enlargement, contribute signs pointing to dilatation in distinction from hypertrophy. The evidence obtained from percussion relates to the form of the area of deep dullness. If the boundaries of the heart be delineated on the chest by means of percussion, the transverse dimension of the area exceeds the vertical in proportion as dilatation predominates over hypertrophy. This corresponds to the difference as regards the form of the heart, which has been stated. The outline which the heart presents is wedge-shaped or nearly square if the dilatation be excessive. Palpation furnishes negative characters more readily available and striking. The powerful apex-beat of hypertrophy is wanting; also the elevation of the ribs and the heaving of the præcordia. The impulse of the apex is feeble, and may be suppressed. The movements of the organ, owing to the extended space in which it is in contact with the thoracic walls, are sometimes obscurely felt, and oftener visible in two, three, four, or even more intercostal spaces, which together present an appearance of fluctuation, or, as called by Walshe, quasi undulation. In some cases, in which the thoracic walls are thin, and the intercostal spaces wide, the heart seems to be almost exposed to the vision and touch. Auscultation furnishes certain distinctive points pertaining to the heart-sounds. Both sounds are feeble in comparison with their augmented intensity in cases of hypertrophy, but the first sound is disproportionately weakened. The first sound is also altered in character; it becomes short and valvular, resembling in these respects the second sound. The latter alterations, although distinctive of dilatation as contrasted with hypertrophy, are not peculiar to the former, and their true explanation has not been understood. They are due to the impairment or absence of the element of impulsion in the first sound. This element is deficient or wanting whenever the left ventricle lacks the muscular power necessary for its production. In hypertrophy this element is intensified, owing to the increased force of the ventricular contractions; and in dilatation it is feeble or absent, owing to the feebleness which, at the same time, renders the apex-beat weak or inappreciable. But this element is also impaired or absent when, from other causes than dilatation, the muscular power of the heart is weakened. The intensity of the first sound is diminished disproportionately to that of the second sound, and it is also short and valvular like the second sound, in cases of fatty degeneration, and of softening in typhus fever, and of pericarditis with effusion. The valvular element predominates, or is alone present, in consequence of the feebleness or absence of the element of impulsion. But the intensity of the valvular element is also more or less diminished, in the first place, in consequence of the weakness of the ventricular contractions, and in the second place, because at the time when the ventricular contractions take place, the quantity of blood within the ventricles is large, causing closure of the auriculo-ventricular valves.

"In the diagnosis of enlargement by dilatation, assuming the fact of enlargement to have been ascertained, symptoms (as distinguished from signs) have considerable weight. Passive congestions, lividity, feeble pulse, and dropsical effusion, in fact, constitute evidence almost, if not quite conclusive. The obstruction due to the valvular lesions which are so generally associated with enlargement, it is true, contributes toward the production of these symptoms; but, as will be seen when valvular lesions are considered, the obstruction due to these rarely, if ever, gives rise to the effects just mentioned until dilatation of the cavities of the heart has taken place. With the aid of the physical signs, the discrimination between predominant dilatation and predominant hypertrophy may generally be made with confidence. The differential diagnosis is of importance with reference to prognosis and treatment. The prospect of life and tolerable health is less in proportion as dilatation predominates, and the management involves attention to incidental events which do not occur as long as hypertrophy predominates. For the convenience of comparison with the physical signs distinctive of hypertrophy (see page 149), the signs distinctive of dilatation are embraced in the following summary:

SUMMARY OF THE PHYSICAL SIGNS DISTINCTIVE OF ENLARGEMENT BY DILATATION.

"1. *Percussion.*—The transverse dimensions of the space occupied by the heart greatly exceeding the vertical, the form of this space corresponding to the wedge-like or square form of the organ when the dilatation is excessive.

"2. *Palpation.*—The apex-beat devoid of abnormal force, and in some instances suppressed. Absence of heaving movement of the ribs and præcordia.

"3. *Auscultation.*—The element of impulsion of the first sound deficient or absent, and the sound short and valvular; in these respects resembling the second sound."

TREATMENT OF DILATATION.

The indications for the treatment of enlargement by dilatation in some respects does not differ from the treatment of predominant hypertrophy. In other and important respects, however, the treatment materially differs.

You cannot remove the impediment to the circulation which co-exists in the great majority of cases, but the effects may be mitigated, if you have your patients avoid the extrinsic causes which excite unduly the action of the heart.

In the dark days of the history of medicine, incalculable evil was done, under the impression that the mass of blood must be diminished. Bloodletting was resorted to, giving temporary relief, but ending most disastrously, by causing anæmia and muscular atony, accompanied with excessive cardiac irritability. The same effect was produced by drenching patients with saline drugs, or the use of exhausting cathartics. When these were abandoned, the allopathic school resorted to large doses of *aconite*, *antimony*, and similar exhausting remedies, which only made the disease worse, by weakening the nervous and muscular power of the heart.

Before speaking of medicinal agents, I will give you the general rules which you should try to make your patients adopt. Excessive muscular exercise, mental excitement, or anything calculated to excite unduly the action of the heart, should be avoided.

The great end of the treatment, remember, is to *increase the muscular power of the heart.* The diet, therefore, should be as highly nutritious as possible, and the quantity of liquid ingesta as small as is compatible with comfort. A diet of solid, easily-digestible, animal food, with a careful admixture of nutritious vegetables, should be advised. At the same time advise the patient to avoid any articles that appear to digest with difficulty.

Indigestion, constipation, hepatic torpor, or inactivity of the lungs, must be removed as soon as discovered, and carefully guarded against. The mental condition of your patient will have much to do with his condition. Depression of spirits tend to aggravate the disease. You must encourage as much as possible, in order to prevent the gloomy forebodings which annoy and depress. You can do this conscientiously, for in the majority of cases under your care, you can safely encourage hope, not of a complete cure, perhaps, but of tolerable health for an indefinite period. The common notion that disease of the heart ends in sudden death is erroneous, and you should strive by the most positive assurances to remove this idea from the minds of your patients.

The *medicines* most useful in the treatment of dilatation have already been enumerated under the head of Enlargement by Hypertrophy. This, at first thought, may seem strange; but when you remember that all medicines have a double pathogenetic action, you can readily see that they will prove curative in opposite pathological conditions. You will observe this in the provings of all medicines, and also from the fact that a medicine is recommended for constipation and diarrhœa, spasm and paralysis, irritation and torpor.

I will, therefore, recapitulate the same classes I gave you in the previous lecture, but with the apppropriate indications:

Class I. Includes medicines whose primary effect is to depress and weaken the muscular and nervous power of the heart, and give rise to conditions which would tend to cause dilatation; but whose secondary effects are similar to those conditions described in the last lecture.

All the truly representative men of the allopathic and eclectic schools now recognize the fact, that *small doses of depressing medicines act as tonics to the tissues they primarily depress.* In proof of this I refer you to the recent writings of Dr. J. R. Reynolds, Handfield Jones, Trousseau, Brown-Séquard, Flint, Scudder, King, and others. This is an affirmation of the theory promulgated by Hahnemann, and which forms the basis on which rests our important and universal Law of Cure. The Law of Dose, which I have taught you in my lectures when occupying the chair of Materia Medica, is, however, equally important, for without it, the selection of the dose is a matter of great uncertainty.

The medicines of this class, then, which primarily depress the heart's vitality, are especially indicated in the treatment of *dilatation*, and its co-existing debility of the structure of the heart. They are:

Aconite, *veratrum album*, *veratrum viride*, *gelseminum*, *tartar emetic*, *colchicum*, *lobelia*, and *tabacum*.

While I advised you to use these remedies in the lowest attenuations or mother tincture, in concentric hypertrophy when there is an abnormal increase of power, I now advise you to use these medicines in high attenuations, for the reason heretofore given, that the *smallest possible doses should be given when we are treating symptoms similar to the primary effects of medicines.*

The two most prominent physicians* of the opposite schools *almost* recognize this rule, for they prescribe the above medicines in the following manner, namely, ten or twenty drops of the tincture in four or eight ounces of water; a teaspoonfull every three or four hours.

Leaving you to select each medicine in accordance with its characteristic symptoms, I advise you to give the attenuations from the 3rd to the 3000th. After you have chosen the appropriate remedy, do not change too soon, but continue its use until you are satisfied with the improvement, or are sure it is not causing the wished for amendment.

I am not favorable to the alternation of remedies, as a general practice, but I have so often seen beneficial results follow the alternation of remedies belonging to Class I. with those belonging to Class III., that I have no hesitation in advising the practice.

I will only give a few of the most characteristic symptoms of these medicines:

Aconite: pulse irregular, quick, weak, thready, and small; feeble and incomplete action of the heart; the pulse and heart-beats do not agree; coldness of the extremities, numbness and tingling of the cold extremities; great anxiety and fear of death accompany the attacks of palpitation (dilatation of left ventricle.)

Veratrum album: pulse very small, almost imperceptible; intermittent; heart's action feeble, irritable; palpitations, with distressing dyspnœa; cold face, with cold sweat on the face and forehead; cold and livid hands and feet, with tendency to cramps in extremities. No *fear* of death, or great anxiety, as from *aconite*, although the patient may think death is near (dilatation of right ventricle).

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* J. Russell Reynolds and Scudder.

Veratrum viride: pulse soft, feeble, but very slow, hesitating, or intermittent; excessive irritability of the heart, so that the slightest motion in bed, or sitting up, causes faintness, vertigo, and blindness; pale face, but not the excessive coldness of *verat. alb.*; indifference, no fear of death.

Gelseminum: pulse soft, slow, almost absent; heart's action very feeble, slow, almost imperceptible; *fear of any movement, lest the heart should stop beating;** veins of the neck distended; extremities not cold, but apparently swollen from venous turgescence, slightly livid; indifference; obtuseness; difficulty of lifting the upper eyelids, dimness of sight; heaviness and weariness of the limbs; palpitations feeble, (dilatation of left ventricle.)

Tartar emetic: pulse small, thready, irregular, feeble; heart's action feeble and irregular; dyspnœa of a very severe character, with cough and frothy expectoration; congestion of the lungs; cannot lie down; enlargement of the liver; jaundice; attacks of vomiting; (dilatation of right ventricle, with cardiac asthma.)

Sanguinaria: for nearly the same symptoms, except that the expectoration is bloody.

Colchicum: pulse and heart's action feeble; urine scanty and albuminous; tendency to dropsy, beginning with œdema of the feet, then extending upward.

Lobelia: pulse small, feeble, and irregular; heart's action irregular and weak, aggravated by the slightest exertion; *distressing sinking sensation at pit of stomach*, attended with agonizing attacks of dyspnœa; anxiety, and fear of death; cold face and extremities; cough, with serous expectoration; (dilatation of right ventricle.)

Tabacum: for nearly the same symptoms as *lobelia*, but with vertigo, and sensation of *shocks in the heart*, with feeble distressing palpitations.

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* A very characteristic symptom, just the opposite of all other medicines.

Class II. contains medicines which act in a manner directly the *reverse* of Class I., *i. e.*, their primary action is *similar* to (not identical with) the secondary effects of the latter. I have explained to you this primary action of *digitalis* and its analogues, and described the condition of the heart from their ultimate primary action. Their secondary effects on the heart are *weakness*, *irritability*, and even *paralysis*. I believe their long-continued pathogenetic effects would result in dilatation of the heart. They are among our very best remedies in that condition; but in order to get prompt, palliative, and curative effects, you will have to give appreciable doses, not going higher than the *third* decimal dilutions, even for infants. You will often get the best effects from the mother tinctures, or the aqueous infusions. These medicines, you will remember, are: *digitalis*, *cactus*, *hydrocyanic acid*, *prunus vir.*, *prunus laurocerasus*, *amygdalus persica*, and *lycopus*.

Digitalis. In the spring of 1867, I read a paper on the action of *digitalis* before the Illinois State Hom. Med. Society, which paper was afterwards published in the third volume of the *United States Medical and Surg. Journal.* To this paper I would refer you if you wish all the necessary proofs as to the *tonic* effects of *digitalis* in cardiac debility. The primary action of *digitalis* is quite transient. For this reason you will find its sphere of action in sthenic diseases much more limited than in the asthenic; in a weak condition of the heart oftener than in inflammations or concentric hypertrophy. It is indicated in all the varieties of hypertrophy with *dilatation*, whatever the cause may be, or any condition of the heart where its muscular power is especially deficient. This is directly contrary to the teachings of nearly all authorities up to a few years ago. Prof. Tully, however, was a notable exception. He boldly placed it among his "*antisbestic*," or exhaustion-opposing medicines, and asserts that he has given it for *years* to the same patient without any other than excellent effects. He used it freely in cases of hypertrophy, but it is evident, from his description, that they were cases of dilatation. Of late years, the best practitioners of the allopathic school use it without fear in cases of dilatation, even in large doses. I will quote to you from Flint, who is evidently an unbiassed witness. He says, "As a remedy, with reference to irregularity of the heart's action incident to dilatation, *digitalis* often manifests a truly remarkable efficacy. Of the different preparations the tincture is to be preferred, on account of its being more reliable as regards strength. *Digitaline*, however, has still more this advantage, and is perhaps entitled to preference." Alluding to the conflicting opinions relative to its action, he says, "Without discussing these different opinions, it may be assumed that, given in small or moderate doses, for example, from ten to thirty drops of the tincture, it cannot, under any circumstances, have much potency to do harm, and it cannot prove a dangerous remedy. That it renders the action of the heart slower and more regular is undeniable. With reference to these effects, Bouillard calls it "the opium of the heart. That it produces these effects without weakening the heart may be assumed; and clinical observation appears to show that, under its use, the heart, already weakened by dilatation, acts with increased strength. With these views, it is a remedy useful in cases both of hypertrophy and of dilatation." Flint does not say how often his thirty-drop doses should be repeated, but I assure you that if they were repeated every two or three hours in a case of hypertrophy with enlargement, they would cause dangerous cardiac spasms, while in dilatation no such dangerous results would follow, although no such large doses are admissible, except in sudden cardiac syncope, and similar emergencies. I have found that doses of one, two, or five drops of the first dilution, repeated every two or three hours, acted well in children or sensitive adults, but the mother tincture in similar doses may be required. In cases of dilatation, give the *digitalis* until it causes the requisite *slowness*, strength, and regularity, even if you have to increase the dose to Flint's standard to bring about that result.

I do not speak from mere theory in this matter, but from much practical experience, which experience I have found to substantiate my theory of dose.

There is another fact relating to the use of *digitalis* in dilatation. This condition will, as you are aware, cause various pathological conditions in other important organs—

the brain, lungs, liver, and kidneys. Dilatation causes passive congestion, with consequent torpor of function in all these and other organs. Therefore, in cerebral, pulmonary, hepatic, and renal troubles; in vertigo, apoplexy, cough, hæmoptysis, jaundice, enlargement of the liver, dropsy, etc., you should always ascertain if cardiac debility is not at the bottom of the trouble. If you find this to be the case, *digitalis* is the *chief* remedy always. As for *characteristic symptoms* whereby to select this remedy, I must say that they appear to me of less value than a knowledge of *the* pathological condition of the heart and its consequences I have just delineated. If you consult any work for *symptoms* go to the *Symptomen Codex*, but even there you will find the indications unsatisfactory. Neither Lippe nor Gross give any indications of value for *digitalis* in cardiac disease. If I were to name any group of *symptoms* indicating its use in dilatation, these would have the preference: quick, weak, irregular, or intermittent pulse; increased or deficient *action* of the heart, with *deficient force* or impulse; cough, hæmoptysis, jaundice, alternate scanty and profuse urine, sometimes albuminous; œdema of the feet, legs, face, and scrotum, ending in general anasarca; sighing respiration, with sinking, weak feeling at pit of stomach; and sometimes vertigo and amaurosis.

I shall allude to *digitalis* again in the treatment of valvular diseases.

✓ *Digitalin* is sometimes more efficacious in dilatation than the tincture. I allude to the *digitalin* of Quevenne, the only preparation of any value. It occurs in pale straw-colored scales, or a white powder, and is inodorous and extremely bitter. The triturations should always be made on the centesimal scale. You will get the best effects from the 1st to 3rd triturations, of which a grain may be given every three hours.

Hydrocyanic acid is the nearest analogue of *digitalis*, but it acts with greater intensity and rapidity. The primary action of this poison I have already given you. Its secondary action does not materially differ from that of *digitalis*. After the primary effects have passed away, the heart becomes weak, flaccid, and subject to irregular action and severe pains, which I think are myalgic. These symptoms make it indicated in dilatation with asthmatic troubles, and attacks of angina pectoris. The provings have "tightness of the chest; feeling of suffocation, with torturing pains in the chest; sticking in left side of chest, and pain and pressure in the region of the heart; irregularity, with feeble beating of the heart." You must be exceedingly cautious in prescribing the dilutions. The 1st decimal dilution cannot be taken in doses of one drop frequently repeated, without causing, in sensitive persons, unpleasant symptoms; but you can put 10 or 15 drops in half a glass of water, of which a teaspoonful may be taken every two or three hours. Its use should be suspended, or the doses given at longer intervals, as soon as the action of the heart becomes stronger and more regular. The 3rd dilution may be given in drop doses. But when this acid is indicated, there are agents which contain it and other additional medicinal constituents, making them of greater value in the treatment of cardiac affections. The best of these is the:

Prunus virginiana (wild cherry) which contains a principle which possesses *tonic* properties, similar to *china* and *hydrastis*. This property is also possessed, in a greater degree, by the *cerasus serotina* (choke cherry).

We have no provings of these remedies, but their successful use for nearly a century, has given us clinical experience sufficient to give us reliable data.

I can give you no better indications than those of *digitalis*, to which can be added "weakness, loss of appetite, *slow digestion*, cough, *tightness and constriction of the chest*, and *a fulness and pressure in the head*." The symptoms in italics I have often observed to arise from large doses of the infusion of the bark of these trees. You can use a hydro-alcoholic tincture of the fresh bark in drop doses, or the lowest dilutions, or the syrup, or the cold infusion, made by digesting or percolating one ounce of the fresh, or dry inner bark in a quart of water, until it assumes a dark red color. This may be given in table-spoonful or wine-glassful doses, repeated every three or six hours. Those who are sticklers for the high dilutions may object to this method of prescribing a medicine, but I cannot see the necessity of adhering to any one method of preparing our remedies. If a medicine is homœopathic to the disease, it matters not in what form we give it, if the doses are not large enough to cause pathogenetic symptoms. Your object should be to cure your patient in the quickest manner, regardless of peculiar notions relating to arbitrary pharmaceutical preparations.

The leaves, pits, or inner bark of the *amygdalus persica* (peach) is much stronger in prussic acid, and may be used in infusion or hydro-alcoholic tincture, but in one-half or one-third the quantity recommended for *prunus*.

The *amygdala amara* (bitter almond) is still more powerful. This medicine, as well as the pit of the peach, may be prepared in triturations, and used in the 1st. In cases of hypertrophy with dilatation I have known a few bitter almonds eaten before and after meals prevent the palpitations which are apt to occur after eating.

Lycopus virginicus is likely to prove one of our best remedies in dilatation. If you will refer to the provings and clinical experience recorded in "New Remedies," you will see that its sphere of action is evidently that of a cardiac sedative and tonic. It is useful in dilatation associated with and causing pulmonary troubles, such as congestion, hæmoptysis, cough, and dyspnœa. You can prescribe it in the tincture or lowest dilutions, or an infusion of half an ounce of the leaves to eight ounces of hot water. Of this a teaspoonful may be given every two or four hours.

Ferro-cyanuret of potash has lately been introduced into practice as a remedy for hypertrophy, as well as for functional disorders of the heart. This double salt is of a yellowish color, and quite innocuous when compared with the *cyanide of potash*, with which you should be careful not to confound it.

Dr. Ray, in a recent paper, speaks very highly of its use, and gives several clinical cases in which he prescribed it with excellent results. The symptoms which he removed with it were: *palpitation*, *ringing in the ears*, *vertigo*, *intermittent pulse*, *waking with a sense of suffocation*, *palpitation disturbing sleep at night*, *improvement in the open air*. Some of the cases were doubtless purely functional, others apparently structural.

You will doubtless find it especially useful in those cases which seem to require *iron* and *digitalis*. This meets the indication for both, and may be given in grain doses of the 1st decimal trituration, repeated every few hours. It is peculiarly suitable in those cases of dilatation aggravated by venereal excesses. In doses of 10 or 15 grains every five hours it soon destroys all sexual desire and power, (while its use is continued) and arrests the cardiac irritation.

We next come to the remedies of Class III., namely: *nux vomica*, *ignatia*, *collinsonia*, *cimicifuga*, *china*, *hydrastis*, *ferrum*, *cuprum*, *hypophosphite of potassa*, *phosphoric acid*, *sulphuric acid*, *muriatic acid*, etc.

Nux vomica, and its alkaloid, *strychnia*, are the most important of this class. By referring to your notes on the treatment of hypertrophy with enlargement, you will find *nux vomica* recommended for its primary symptoms. Allusion was made to its secondary effects, which are very profound and important. The reaction from the intense stimulation (primary) induces a condition of nervous and muscular irritability in proportion to the weakness which obtains in the nerve-centres. To make matters worse, all the important organs of the body partake of the prostration and loss of tone. The liver, stomach, intestinal canal, renal and sexual organs, and even the brain, become the seat of morbid irritability and perverted function.

I will not attempt here to give you all the symptoms which indicate its use in hypertrophy with dilatation. They are too numerous for me to mention and for you to remember. Suffice it to say, that the general mental and physical condition, the weakness and irritability of the heart, the aggravations after meals and from emotions, and the dyspeptic symptoms, must be your guide. First be sure of your diagnosis, then consult the *Symptomen Codex*, or the excellent *materia medica* cards of Prof. Hoyne, and prescribe for the *ensemble* of the symptoms.

The dose of *nux vomica* is quite important. As a rule, the lowest dilutions or triturations will give you the best results. The 1st or 2nd decimal dilution, or trituration, one drop or one grain every three or six hours, will, in a few days or weeks, produce a notable curative result.

Strychnia will sometimes give better satisfaction than the *nux vomica*, especially when there is a preponderance of symptoms denoting spinal exhaustion, and a general tendency to paralysis of muscular power and torpor of function. Use the *centesimal* triturations, from the 1st to the 3rd.

Ignatia, while it resembles *nux vomica* in some respects, has important symptomatic differences. It is more suitable for women; for the hysterical condition; for irregular manifestations of a spasmodic character; and for the effects of grief. A characteristic symptom which is a valuable guide is the "sensation of great weakness and sinking in the stomach." This feeling oftener proceeds from cardiac weakness than any other cause.

Dose: the same as *nux vomica*.

Collinsonia is certainly of considerable value in this disease. While it does not appear to me to act on the nerve-centres like *nux vomica*, it resembles that remedy closely in its action on the vegetative system, and the various organs of the body. Dr. Squire thinks* we have no remedy superior to it in chronic functional or structural diseases of the heart. He asserts that he has given it in nearly one hundred cases of cardiac trouble, and that it has not failed to give relief in a single case. In one patient suffering with hypertrophy, the irregular action of the heart ceased in a few days, and in three months he was discharged cured. The doses used in these cases were 15 drops of the fluid extract three or four times a day. He remarks that, "*larger* doses did not have the desired effect," which shows that pathogenetic aggravations were present in some degree.

The 1st dilution, or drop doses of the tincture, may be prescribed. Consult the provings and account of its cures in "New Remedies," for further indications.

Cimicifuga, from its well-known action on the muscular and nervous system, will doubtless often aid you in the treatment of hypertrophy with dilatation. It is *the* remedy, *par excellence*, for the palliation and cure of *myalgia*. It occupies a place between *nux* and *china*, partaking of the characters of both. It does not seem to affect the functions of the vegetative system so much as the nerves of motion and sensation. All weakened muscles become irritable, painful, and subject to spasmodic movements. *Cimicifuga* controls this condition, and restores the normal tone of the nerves which supply the muscles. Chorea is sometimes associated with cardiac debility; even the movements of the heart may partake of that character. In such cases, no remedy rivals *cimicifuga.* If the disease is a sequel of muscular rheumatism, this medicine is especially indicated. In dilatation during pregnancy, or at the critical age, no remedy will prove more useful. If sympathetic cerebral symptoms occur, *cimicifuga* will be finely indicated.

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* Eclectic Medical Journal, Vol. 1871, page 267.

Dose: the dilutions from 1st to 3rd, or the lowest triturations of *cimicifugin* (*macrotin*), its active principle. Do not leave off its use too soon, or change the remedy until you are sure it is not appropriate.

Agaricus should be consulted if *cimicifuga* seems indicated but does not give satisfaction.

China, or its alkaloid, *quinine*, has already been spoken of. While you will rarely have to use it in enlargement, you will frequently find it invaluable in dilatation. It is especially useful if the disease is associated with, or produced by malaria, loss of the vital fluids, long-continued night watching, or deficient food. The action of the heart may be very tumultuous, while the real force is weak; the blood is poor, and deficient in quantity; the countenance sallow; digestion impaired, with tendency to flatulence; there is ringing in the ears, vertigo, and night sweats.

Hydrastis, or the active principle, *hydrastin*, ranks next in importance. As a restorer of the tone of muscular tissue it is not surpassed. It is indicated in those cases which do not arise from malaria, but which appear to indicate *china;* also for those cases where the action of the heart is persistently weak and excited, and where the patient is emaciated, is troubled with indigestion, and the liver is also deranged. Its persevering use will bring about permanent good results.

Dose: the lowest dilutions of *hydrastis*, or triturations of *hydrastin.*

Ferrum. All the preparations of iron are indicated in dilatation, especially if it co-exist with anæmia. In selecting the preparation, the idiosyncrasies of your patient must be taken into account, as well as the bodily constitution. *Ferrum metallicum* or *ferrum carb.* are indicated in uncomplicated cases. If fatty degeneration of the heart is suspected, use *ferrum iod.* If dyspeptic symptoms predominate, try the *lactate of iron*, or the double salt of *iron* and *strychnine*. Certain cases will require the *phosphate of iron*, and others improve rapidly under the *tinct. ferr. muriaticum* in the low dilutions. The dose of the ferruginous preparations may range from the 1st to the 6th.

Cuprum, according to Grauvogl, will cure some diseases associated with anæmia when *iron* fails. For dilatation with fatty degeneration it appears to be decidedly indicated.

The *hypophosphite of potassa* is a favorite remedy with me in all heart affections with muscular atony or myalgia. All the potash salts appear to have an affinity for muscular tissue, and none more so than this. If the patient has been prostrated by excesses, loss of fluids, loss of sleep, mental labor, and is emaciated, use this salt in doses of $\frac{1}{4}$ to $\frac{1}{10}$th grain three times a day; alternate with *hydrastis*, *nux vomica*, or *collinsonia*, and the results will be very satisfactory.

The *mineral acids* have not been used as often or as thoroughly in cardiac affections with debility, as their merits demand. The *phosphoric acid* is unrivalled as a remedy when indicated by the general symptoms of the patient. *Sulphuric acid* has enabled me to relieve and prolong the life of several patients suffering with dilatation, co-existing with Bright's disease. Not only did the heart's action improve under its use, but the renal disease was decidedly benefitted, the dropsical symptoms disappeared, and the appetite and strength returned in a short time.

Muriatic acid will prove a valuable remedy in your hands. Study the provings well, and the clinical indications, and select accordingly. In prescribing these acids, insist on the aqueous dilutions, from the 1st to 3rd, sufficient to render the water slightly acid, and repeat the dose four or five times a day.

The remedies of Class IV., namely, *belladonna*, *solanum*, *lachnanthes*, *glonoine*, *stramonium*, *agaricus*, *æthusa*, *conium*, etc., will be found useful as palliatives when paroxysms of obstinate palpitations, attended by local congestions, occur. In the so-called cardiac apoplexy they are useful medicines.

I cannot give you the indications for all these remedies. You must be guided by their characteristic symptoms and pathological effects. You will find that the middle dilutions (6th to 30th) will give the best results.

Do not forget the anti-psoric remedies while treating dilatation, for they will prove of service to you in combatting lurking miasms, and arousing the dormant energies of the organism.

The *stillingia* and *chimaphila* are very important antipsoric remedies, as well as those introduced by Hahnemann. All this class should be used in the middle or higher attenuations.

LECTURE IX.

LESIONS OF THE WALLS OF THE HEART.

Atrophy of the Heart — Fatty Growth — Symptoms of Fatty Growth — Fatty Degeneration — Symptoms of — Pathological Effects — Treatment — Softening of the Heart — Induration of — Rupture of the Heart — Treatment of the Various Lesions.

GENTLEMEN: The walls of the heart are liable to various lesions, other than hypertrophy. In this lecture I shall briefly consider these organic affections and their treatment.

ATROPHY OF THE HEART

is a condition in which the muscular substance is diminished, the cavities not enlarged, but actually lessened. The whole heart is smaller than the normal size. Its weight is diminished in proportion to its size, but the organ does not change its appearance in any other respect.

Causes. It generally attends chronic disease where there is gradual progressive emaciation. It has been observed in tubercular phthisis, pericardial adhesions, calcification of the coronary arteries, and an excess of fat on the exterior of the heart. The heart wastes like other muscles when badly nourished.

The *symptoms* are those which denote feebleness of the circulation, but the feebleness of the circulation may have existed prior to the atrophy. The physical signs suffice for the diagnosis. The boundaries of the superficial cardiac regions are within the limits of health, the apex-beat is indistinct or wanting, and the heart-sounds are abnormally feeble, and may be inappreciable.

The *treatment* of atrophy, when due to impaired nutrition, is the same as that adopted for enlargement by dilatation.

The remedies in Class III., together with a highly nutritious diet, to which may be added cod liver oil in doses of 20 or 30 drops three times a day.

FATTY GROWTH AND DEGENERATION.

Fatty growth. More or less fat is generally present in health, on the outer surface of the heart, after early infancy, especially on the right ventricle, at and near the base of the organ. It is most abundant between the ventricle and auricle, and around the coronary vessels. A small amount of over-accumulation is sometimes found in *post-mortem* examinations, where there had been no symptoms of disease of the heart during life. When the accumulation is excessive it leads to enfeebled muscular action, and consequent weakness of the circulation. It may induce atrophy of the heart. Fatty growth usually occurs after the middle period of life, and in persons of adipose diathesis. It may, however, occur in persons who are not corpulent. You will most frequently find it in persons who are growing fat rather rapidly. The heart has been known to become completely encased in a thick layer of adipose tissue.

Fatty infiltration is another and more serious form. In this disease there is an accumulation of fat between the muscular fibres. The pressure upon the fibres causes functional weakness and atrophy, and leads to dilatation.

Fatty degeneration is much more serious, and differs essentially from the two varieties I have just mentioned. The fat, in the form of oil drops or granules, replaces the muscular substance, and constitutes a form of fatty atrophy. It may be associated with fatty growth of the heart, but it occurs independently of the latter. It affects more especially the *left* ventricle, while fatty deposits *on* the heart affects the *right.* It may be uniformly diffused, but is oftener confined to circumscribed patches or strips. The portions affected assume a yellowish or fawn color, and if it occurs in patches, gives the heart a mottled appearance. Examined with the *microscope*, the striæ, or transverse markings of the fibres are indistinct or wanting, and in place of the proper constituents of the muscular fibre, there are oil globules and granules, in more or less abundance, according to the amount of degeneration.

In this disease, fat replaces the muscular substance, and in proportion as this result obtains, the propulsive power of the heart is diminished; it yields more readily to distension, and dilatation occurs. Authorities differ as to the real condition, for while some believe that the muscular substance is *changed* into fat, others believe that the fat is *substituted* for the normal muscular substance. Others teach that it is a chemical, not a vital process.

Causes. As I have before stated, you will not always find either variety in adipose persons. It often occurs in persons who have fatty deposits or fatty degeneration elsewhere, as in the liver or spleen. The etiology may involve both general and local causes. Among the local causes is impairment of nutrition from obstruction of the coronary arteries, from atheromatous or calcareous disease. It may occur from hypertrophy, valvular lesions, emphysema, or Bright's disease. It occurs in connection with the tuberculous and carcinomatous cachexia, also in cases of pyæmia or septicæmia. It may be caused by the poisonous effects of *phosphorus*, *arsenic*, and some other poisons. *Alcohol*, in excess, undoubtedly has a causative influence. In old habitual drunkards this condition is generally found after death.

SYMPTOMS AND PATHOLOGICAL EFFECTS.

Although the different forms of fatty disease differ pathologically, their general effects are similar. Both cause weakness of the heart and enfeebled circulation, but not in an equal degreee. I have told you which produces the most serious results. Fatty growth, and even degeneration may be present in a large degree, and not suspected up to the moment of death; and rupture of the heart has been known to occur from fatty degeneration, and the patient show no symptoms of the disease during life.

The *pulse* may be very slow, down to 20 or 30, and even 8 or 10, per minute. It will always be deficient in *force*.

It may be intermittent, irregular, very frequent and feeble.

A sense of oppression at the præcordia, palpitation, and a tendency to syncope, are commonly observed. Flint has observed, and so have I, a notable degree of capillary congestion of the extremities. In one case which came under my observation, the hands and feet would become intensely red, especially after meals. Dyspnœa is present in this, as in other heart affections.

Certain symptoms referable to the nervous and respiratory system, are supposed to be highly significant of fatty degeneration: (1) The occurrence of seizures resembling apoplexy, but not followed by paralysis. After death no morbid appearances are observable in the brain; (2) A peculiar aberration of the respiratory movements was observed by Cheyne, and Stokes, "It consists in the occurrence of a series of inspirations increasing to a maximum, and then declining in force and length until a state of apparent apnœa is established. In this condition, the patient may remain for such a length of time as to make his attendants believe he is dead, when a low inspiration, followed by one more decided, marks the commencement of a new ascending and then descending series of inspirations." This is said only to occur a few weeks before the death of the patient. But this symptom has been known to occur from hypertrophy of the left ventricle, without fatty degeneration; (3) Fatty degeneration of the *cornea*, giving rise to that appearance known as *arcus senilis*, has been observed, but I have observed it when no symptoms of heart disease were present.

PHYSICAL SIGNS AND DIAGNOSIS.

You will not find it very easy to diagnose fatty disease of the heart from the physical signs; but if no valvular disease is present, and hypertrophy is not found, and the heart's action is feeble, and the patient is adipose, you may safely *infer* the presence of fatty heart.

If you suspect fatty *degeneration*, and find that percussion shows moderate or no increase of the volume of the heart, you have a negative point. If you find that the apex-beat is not removed from its normal position, and its beat feeble, or inappreciable—and no impulse elsewhere than over the apex;

and if by auscultation you find the sounds of the heart weakened, the first more than the second, and that is short and valvular; and, finally, if you find both sounds extinct, you may safely consider the case one of fatty degeneration.

TREATMENT.

In the treatment of fatty growth and degeneration, you must have three objects in view, namely:

I. To obviate and relieve the immediate effects of weakness of the heart.

II. To increase permanently the muscular power of the organ.

III. To arrest or limit the accumulation of fat.

I. The immediate effects of the cardiac weakness are, palpitation and præcordial distress, syncope, dyspnœa, and perhaps apoplectiform attacks. These occur in paroxysms, excited by over-exertion, mental excitement, etc. To combat these symptoms, you should use as palliatives, in severe attacks, wine, spirits, ether, or ammonia, and continue their administration until the urgent symptoms disappear or are much relieved. The specific remedies for these symptoms you will find in Classes I. and II., in the treatment of dilatation, with the indications for their use, to which I refer you. In the apoplectiform seizures, especially, you will find *Gelseminum* 6th, or *Acidum hydrocyanicum* 3rd, particularly indicated—the former if the attack was rather slow in coming on, the latter if it was very sudden in its invasion. In general, the two best remedies are undoubtedly *Aconite* and *Digitalis*—the former in the 3rd dilution, the latter in the 1st or mother tincture. Whichever remedy you select, give it as frequently as the urgency of the case demands, until the pulse becomes full and regular, and the condition of the patient has much improved. If the extremities are cold, advise the mustard foot and hand bath, to divert the blood from the heart.

II. The second object is to increase permanently the muscular power of the heart. This is to be accomplished by the judicious administration of those remedies belonging to

Class III. mentioned under "Dilatation," namely: *Ferrum* and its various preparations (the *Iodide* is the best in this disease), *nux vomica*, *ignatia*, *hydrastis*, *manganese*, *aletris*, *helonias*, *china*, *ptelia*, *cuprum*, *platinum*, *plumbum*, the *hypophosphites*, and the mineral acids.

The anti-psorics may be useful to combat the various dyscrasia, and may be advantageously alternated with the remedies just mentioned.

You will find that the lowest attenuation of Class III. will bring about the best results, while the high dilutions of the anti-psorics are most appropriate.

The *diet* of the patient is of great importance. You should aim to produce a healthy nutrition of the affected organ by rendering the blood rich in nutritive materials. All articles of diet allowed should be highly nutritious and easily assimilable. As large a portion of animal food as the digestive powers will permit should be advised. The meat should, however, be lean, tender, and properly cooked. The quantity of fluids should be restricted, in order not to make the quantity of water in the blood excessive. Warm clothing, especially about the extremities, should be insisted on. Excess of all kinds, in eating, drinking, venery, mental occupation or excitement, late hours, etc., should be prohibited. As physical indolence predisposes to this affection, a judicious course of exercise in the open air should be advised. But while exercise is advised, it should not go to the point of causing dyspnœa or palpitation. In order to have exercise do good there must be an interesting object. For this reason, hunting, fishing, botanizing, horseback riding, etc., are the best methods.

III. It is important that you should try to arrest or limit the accumulation of fat in or upon the heart. Although the pathological condition in the two forms differ, we do not know that the dietetic treatment should differ. All fatty and saccharine substances should be avoided. Starchy food is also inadmissible except in small quantities. The diet should consist of lean meat, bread, non-farinaceous vegetables, and certain kinds of fruit, principally the acid fruits.

Of medicinal remedies, those which act chemically cannot be used with safety and they have been abandoned. The *bromide of ammonium*, in doses of 5 or 10 grains, three times a day, seems to have the power of diminishing adiposis without injuring the health. I have found that *graphites*, 6th and 30th, used for a month or more, has the same effect. *Phytolacca* appears to have the power of diminishing the amount of fat in the system, when given in the lowest dilutions. It is claimed that the *iodide of potassa* has the same effect. But these remedies should always be alternated with the *ferrum* group.

Baehr says, after recommending *iodine* and *calcarea*, "We have two other remedies which we cannot recommend with sufficient emphasis in heart-disease generally, and more especially in fatty degeneration, we mean *cuprum* and *plumbum*. Both remedies act similarly, except that the action of *plumbum* is more persistent and penetrating." He gives the following indications taken from cases of poisoning:

"*Cuprum:* pulse irregular, small, easily compressible, intermitting, accompanied by excessive muscular debility; the beats of the heart are scarcely, or not at all, perceptible; the sounds of the heart are indistinct; dyspnœa; feeling of anxiety; disposition to faint.

"*Plumbum:* the impulse of the heart is very feeble, or even imperceptible; sounds of the heart indistinct; palpitations, attended with excessive dyspnœa; pulse very soft, easily compressible, intermitting, irregular, 50 to 60 in a minute, less frequently over a hundred, after which it is scarcely perceptible; heart flabby; sudden paralysis of the heart; fainting fits during every exertion, also, attended with slight convulsions, extreme muscular debility, and oppression from the least motion; despondency and dread of death; night mare; œdema of the skin."

The *iodide of lead* ought to prove more valuable than the pure lead for fatty degeneration of the heart.

Baehr thinks *aurum* will prove a good remedy.

Phosphorus and *arsenicum* are the two medicines which correspond pathologically to fatty degeneration. Both cause fatty heart, as well as fatty degeneration of the liver and kidneys. The pathogenetic symptoms also correspond, and theoretically they ought to cure this malady, but we have no clinical testimony to substantiate it. I would advise you to try them when indicated, in the 3rd or 6th attenuation, for a sufficient length of time to test their curative powers.

I have sent a few patients, whose adipose growth in general was immense, to a most rigid hydropathic establishment, where a few months' residence removed a large quantity of the abnormal deposit.

SOFTENING OF THE HEART.

I have already called your attention to this condition, when speaking of inflammation of the heart. It has also been considered as incident to fatty degeneration. It occurs during the course of essential fevers, especially typhoid fever and typhus. Sometimes the softening is limited to the left ventricle, and sometimes it extends all through the heart-substance.

When softening has taken place the walls are relaxed and feeble; the structure easily torn with the finger; the organ is flaccid and collapses with its own weight, not preserving its natural form, but retaining, like a wet cloth, any shape in which it was placed. When incised, the cut surfaces are dry and unpolished, and the color of the cut surface is purplish and livid.

Symptoms and physical signs. These are the same as in fatty degeneration. They proceed from weakness of the organ, and loss of muscular power. Stokes gives the best indications for the diagnosis of this affection, especially when it occurs during fever.

Treatment. The sole indication for the treatment of softening from any cause, is to sustain the failing power of the heart by stimulants, aliments, and restorative remedies. The use of wine, brandy, egg-nogg, beef-tea, wine-whey, aided by *china*, *hydrastis*, *ferrum*, *phosphorus*, and the mineral acids, should be freely used, until the action of the heart denotes such an amount of force as to free the patient from danger. In severe cases the patient must not be allowed to sit up, or make any sudden movements while the heart is very weak. Fatal syncope has been known to occur from such imprudence.

INDURATION OF THE HEART.

This lesion is so rare, and so difficult of diagnosis, that I will not speak of it at length, nor shall I treat at length of

CARDIAC ANEURISM,

a condition rarely met with, but which the older pathologists confounded with hypertrophy with dilatation. Although a rare lesion, Thierman has collected seventy-four cases on record. The aneurismal dilatation forms a tumor, varying in size, in different cases, from that of a small nut to a sac as large as, or even larger than, the heart itself. It contains layers of condensed fibrin, and various forms of coagula like arterial aneurisms. It is sometimes lined or studded with calcareous matter. For a fuller consideration of this subject, I refer you to works on morbid anatomy.

Flint gives five interesting cases which came under his personal observation.

Treatment. No cure can be effected; but the same treatment recommended for dilatation of the heart would be appropriate, and perhaps palliate suffering and prolong life. Some of the early homœopathic writers recommended *lachesis* and *lycopodium*, but we are in doubt whether they referred to hypertrophy with dilatation or true aneurism.

RUPTURE OF THE HEART.

It is believed that spontaneous rupture of the heart is of rare occurrence; and Flint doubts if it has ever occurred as a result purely of muscular activity of the organ. He believes it is always dependent on some prior morbid condition of the cardiac parieties. I believe, however, that cases are on record where rupture of the heart has occurred from violent mental emotion, independent of cardiac disease. A singular book has lately been published in England, treating of the diagnosis of the crucifixion of Christ. The authors are the eminent London surgeons, William Stroud and Sir J. Y. Simpson. Dr. Stroud, after citing and commenting on a long series of instances of bloody sweat, feels warranted in the conclusion that, "owing to the natural constitution of the human frame, the exciting passions, when violent, and especially when accompanied with agony or conflict, are capable of producing bloody sweat, and when still more intense, rupture of the heart." Among other medical authorities he quotes the younger Gruener, to the effect that it is common for a person whose heart is oppressed by excessive congestion of blood, and who is threatened with suffocation, to "cry out with a loud voice;" and also Dr. Walshe, Professor of Medicine in University College, London, who says, that in case of rupture of the heart, the hand is suddenly carried to the front of the chest and a piercing shriek uttered. Sir James Y. Simpson, whose high rank in the profession has won for him the title of Baronet, adds an appendix to Dr. Stroud's treatise, in which he says, in substance, that usually death very rapidly ensues, in consequence of the blood escaping from the interior of the heart into the cavity of the large surrounding heart-sac or pericardium, and that in such cases the sac will be found, on dissection, to contain two, three, four, or more pounds of blood accumulated within it, and separated into red clot and limpid serum, or "blood and water." As dissection was not practiced in ancient times, the nature of this rare disease was not understood, if indeed its existence was even suspected. These surgeons agree, therefore, that death was occasioned, not by pain and physical exhaustion, which, in a person in the prime of life, would require two or three days, but by a literally broken heart.

Rupture of the heart is almost inevitably fatal, and death occurs instantaneously. Walshe, however, states that one case has been recorded of death from rupture, in which a former rupture was discovered firmly filled by a fibrinous coagulum, adherent to the wall of the heart.

Wounds of the heart belong to the domain of surgery, and I will only say to you, that they are not as fatal as is generally supposed. In the "Surgical Memoir of the War" you will find several cases to substantiate this statement.

LECTURE X.

VALVULAR DISEASES OF THE HEART.

Aortic Lesions — Mitral Lesions — Primary Effects of Valvular Disease on the Circulation — Symptoms and Pathological Effects of Valvular Lesions — Secondary Effects of Valvular Lesions — Pain — Palpitation — Cardiac Dropsy — Symptoms of the Respiratory System — Symptoms of the Nervous System — Symptoms of the Digestive System — Symptoms of the Genito-Urinary System — General Symptoms.

GENTLEMEN: I now come to those diseased conditions of the valves and orifices of the heart which go under the general name of Valvular Diseases. I have reserved this subject for my last lectures because these lesions are connected with, and are the results of the inflammatory affections hitherto treated of. Another and important reason is, that many diseases and functional disorders of various organs of the body, which are often considered idiopathic by unobserving physicians, are really the result of valvular lesions. If the heart does not work in a normal manner, the circulation all over the body is imperfect, and every other organ becomes deranged.

The clinical study of these lesions is of great interest, on account of the wonderful precision with which modern diagnosis, by means of auscultation, enables us to locate the situation and nature of the lesion.

In treating of valvular lesions, my main object will be to describe their immediate and remote effects, and the means by which we can make a correct diagnosis, and finally, the appropriate homœopathic treatment for these effects. The cause can rarely, if ever, be removed.

I shall first take up for your consideration the

AORTIC LESIONS.

Lesions affecting the aortic valves may be limited to one or two of the semilunar segments; but in most cases all are more or less affected. Thickening of the segments is one of the most frequent of the morbid changes. This will not specially impair the function of the valves, but their expansion will be somewhat sluggish, and the intensity of the aortic second sound of the heart must be in some measure diminished.

The segments are often contracted as well as thickened. Consequently a current of blood is forced backward from the aorta into the ventricle, by the recoil of the arterial coats. At the same time the aortic second sound of the heart must be weakened by the diminished size of the valves as well as by the thickening.

Rigidity of the valves from calcareous deposit is of frequent occurrence. The segments are sometimes expanded, and being encrusted with calcareous salts, appear to be completely petrified. This was formerly called ossification.

Another variety of lesion consists in the presence of warty excrescences or vegetations. These are generally attached at or near the free border of the segments, on their ventricular aspect.

These vegetations may be loosely attached, and liable to be separated by the force of the current of blood during life, and become emboli, and obstruct the circulation in the arteries.

Attenuation from atrophy is also a lesion to which the valves are liable. Rupture, under these circumstances, is liable to occur.

Perforations may occur at any point where the valves are softened, and perhaps at the same time thickened.

Lesions in the aorta, extending, to a greater or less extent, above the valves, are, in the majority of cases, associated with lesions of the aortic orifice. The artery may be dilated or contracted.

MITRAL LESIONS.

Lesions at the mitral orifice are essentially the same as aortic lesions, the points of difference relating chiefly to the differences, as regards form and arrangement, of the mitral valves. As a result of their insufficiency, a retrograde stream or current, from the ventricle into the auricle, takes place with each systole of the ventricle, the quantity of blood thus regurgitating, of course, being proportionate to the extent of the mitral insufficiency.

Rupture of the tendinous cords connecting the free margins of the valves with the papillary muscles occasion insufficiency of the mitral valves.

The deposit of calcareous salts at the base of the valves gives rise to lesions, and reduces the the auriculo-ventricular orifice to a small aperture.

Vegetations and warty excrescences occur in this situation as at the aortic orifice. But the most frequent mode in which contraction of this orifice is produced is by the union of the curtains at their sides, leaving a narrow slit through which the blood passes from the auricle into the ventricle.

Aneurism of the mitral, as well as of the semilunar valves, is another variety of lesion.

It is evident, that in so far as the different lesions which have been noticed interfere with the play of the mitral valves, the first sound of the heart must be weakened and modified by the diminution or extinction of the valvular element of this sound.

SYMPTOMS OF AORTIC AND MITRAL LESIONS.

As symptoms referable directly to the heart may be noticed : pain, palpitation, abnormal changes of the pulse, turgescence of the veins, and venous pulsation.

Pain. Absence of pain is the rule, but occasionally patients complain of painful sensations referred to the præcordia. A sense of constriction, uneasiness, or undefinable distress, is oftener met with than actual pain.

Palpitation. Is due, not directly to the lesions of the valves or orifices, but to the hypertrophy to which they have given rise. When the patient complains of the beating of the heart, the impulse is found, on applying the hand over the præcordia, to be abnormally forcible. This increased force is observed when the patient is not aware of any such palpitation. Palpitation, therefore, may be present as an objective, when it is wanting as a subjective symptom.

Other things being equal, the increased violence of the heart's action is proportionate to the amount of hypertrophy, and especially hypertrophy of the left ventricle.

Usually, if the patient complain of undue violence or of irregularity of the heart's action, exclusive of other circumstances, the presumption is that organic disease does not exist.

Palpitation from functional disorder always occasions great uneasiness, and generally intense anxiety and alarm.

It is quite otherwise with palpitation incident to organic disease. As a rule, then, and you may consider it a safe one, palpitation, when accompanied with great uneasiness and uncomplicated, indicates or will suggest to you the non-existence of structural lesion.

Palpitation due to organic disease is less violent. Functional palpitation occurs often when it cannot be traced to any exciting cause, and is more likely to occur when the patient is at rest.

Pulse. You must accustom yourselves to the movements as given by the pulse in heart affections, as well as in other disorders, and it is only by close observation at the bed-side that you will attain that peculiar sense of touch necessary to aid you in your investigations.

You will observe the size, strength, as compared with the heart's impulse (which never overlook), rhythm, its quickness or slowness, the duration of the movement of the artery under the finger, etc.

Frequency of the pulse, although important as representing the general condition of the circulation, and the state of the vital forces, has no special significance as regards vavular disease.

In mitral lesions attended by regurgitation, the size and strength of the pulse are diminished in proportion to the quantity of blood driven backward by the systolic contraction of the left ventricle, into the left auricle. The weakness and smallness of the pulse are in contrast with the impulse of the heart, as felt by the hand applied over the præcordia, provided the left ventricle be hypertrophied and the action of the heart vigorous. The pulse may be regular, but often, in an advanced stage of the affection, its rhythm is disturbed; it becomes irregular or intermitting. Variation of successive beats as respects size, force, etc., is frequently observed, although it is less characteristic of mitral regurgitant lesions than of those attended by obstruction. The frequency of the pulse in this, as in the other varieties of valvular lesions, depends on the vital condition of the heart.

In case of mitral regurgitation, the pulse is rendered small and weak by the deduction of the blood which regurgitates from the quantity which would otherwise be propelled into the aorta with each systole.

Mitral contraction, when extreme, renders the pulse not only small and weak, but often irregular, intermitting and unequal. When from any cause the supply of blood preceding the ventricular systole is less than usual, the pulse, which represents the systole of the left ventricle, is unusually small and weak. Under these circumstances the heart acts with irregularity. Intermittency of the pulse may represent intermittency of the heart's action, but it is sometimes observed where there is not a corresponding interruption in the heart's action.

Intermittency of the pulse is a peculiarity of the circulation in some persons. It is not, therefore, intrinsically a symptom of disease. Weakness, smallness, and irregularity, as well as intermittency, and even inequality, it is to be borne in mind, are not distinctive of mitral or other valvular lesions. All may occur in functional disorder of the heart. A distinguishing point pertaining to functional disorders is, they occur only during paroxysms of palpitation presenting the distinctive features of palpitation from nervous disorder, whereas, occurring in connection with valvular lesions, they are either constant or frequently recurring, and unattended by the features which distinguish functional palpitation.

Aortic lesions giving rise to obstruction are not characterized by a pulse weakened in proportion to the diminishing quantity of blood propelled from the left ventricle. In cases of aortic obstruction, when great enlargement of the heart has ensued, and especially when the muscular power of the organ is much diminished by either dilatation or fatty degeneration, the pulse may become irregular, intermitting, and unequal. Irregularity and inequality are thus, in some measure, diagnostic of lesions affecting the mitral orifice, as contrasted with those affecting the aortic orifice; but it is to be borne in mind that they occur in cases of dilatation, fatty degeneration, etc., uncomplicated with any affection of the valves or orifices.

Slowness of the pulse, that is, the gradual expansion of the artery, as distinguished from quickness (not frequency), denotes the prolonged systole of the left ventricle, and is distinctive of aortic obstruction. In cases of aortic lesions, with considerable insufficiency, the jerking or collapsing feature of the pulse is usually strongly marked. It is not, however, a symptom of aortic obstruction.

Prolongation of the interval between the pulsation of the radial artery and the heart's impulse, is significant of aortic regurgitation.

TURGESCENCE OF THE VEINS AND VENOUS PULSATION.

Abnormal fullness of the veins occurs whenever there is an obstacle to the free entrance of blood into the right auricle. An obstacle exists when the right auricle is already full, or distended with blood. The most direct and efficient causative condition is contraction of the tricuspid orifice. Obstruction to the pulmonary circulation from emphysema of the lungs occasions an undue accumulation of blood within the right ventricle and auricle, leading after a time to enlargement, and a consequent obstacle to the free transmission of blood to the systemic veins. Pressure on the vena cava by an intra-thoracic tumor produces obstruction and venous turgescence. Thus, marked fullness of the veins of the head and neck is observed in some cases of aneurism of the arch of the aorta. As a symptom, then, this is not distinctive in itself of cardiac disease, nor, when it proceeds from the latter, does it point to the seat, or even denote the existence of lesions of the valves or orifices, but rather that the right auricle is either dilated or overdistended.

Venous turgescence is usually most conspicuous on the neck, in the jugulars and the venous branches communicating with them. In extreme cases the vessels present a varicose appearance.

If the obstruction at the right auricle be considerable, when pressure is made on a vein high on the neck, the vessel remains distended below the point of pressure, and may be refilled after the contents of the vessel have been pressed backward by the finger, showing not only a resistance to the gravitation of the blood, but a reflex current.

This symptom, taken in connection with the physical signs which establish the nature and seat of organic lesions of the heart, possesses considerable value.

Venous pulsation is a diastolic movement of the veins, which is visible, and sometimes even appreciable by the touch. The movement is due to a retrograde current or impulse communicated to the blood contained in the veins. It is to be distinguished from the movements occasioned by respiration, with which every one is familiar, and also from those communicated by subjacent arteries. With the latter it is liable to be confounded, unless care be taken to avoid this error. The error may be avoided by making moderate pressure over the veins at the lower part of the neck. Pressure here, not sufficient to stop the circulation in the arteries, will arrest pulsation of the veins. The movements due to respiration may be arrested by causing the patient to suspend breathing for a few seconds. Pulsation is rarely observed elsewhere than in the veins of the neck. It is often limited to the veins just above the clavicles. It is now admitted that venous pulsation, if marked or extensive, is, in a certain proportion of cases, evidence of tricuspid degeneration. (Flint.)

The conditions most favorable for the production of the venous pulse, are free tricuspid regurgitation and hypertrophy of the right ventricle.

The systolic contraction of the right auricle may cause a movement of the blood in a retrograde direction sufficiently to give rise to this symptom. Experimental observations show that the auricular systole precedes the ventricular. A venous pulse due to auricular contraction should therefore precede slightly the arterial pulse, or apex-beat of the heart.

Placing the finger over the apex of the heart, the apex-beat, if it be felt, will be found to follow the venous pulse in the neck, provided the latter be produced by the contraction of the auricle; whereas if the venous pulse be due to tricuspid regurgitation, it will be either synchronous with, or lagging a little behind the apex-beat. By placing the finger over the carotid, and the eye fixed upon a pulsating vein, it is easy to determine whether the venous pulse precedes or occurs simultaneously with the beating of the artery.

CARDIAC DROPSY IN RELATION TO VALVULAR LESIONS.

General dropsy, when dependent on disease of the heart, is called cardiac dropsy. It may be due to other pathological conditions, and especially to disease of the kidney, when it is distinguished as renal dropsy. It appears first, as a rule, in the form of œdema of the feet and ankles, which gradually extends over the lower extremities. Œdema of the face follows, or may occur simultaneously with, or precede, the œdema of the feet. So enormous is the swelling sometimes, that erythema and gangrene may occur. The surface cracks or ulcerates, and allows the liquid to flow away. The surface assumes a dusky hue, due to venous congestion, which distinguishes this variety of dropsy from renal dropsy, but both may be combined. Effusion into all the serous cavities may occur. The occurrence of dropsy has reference to the situation, nature, and degree of valvular lesions. Tricuspid contraction is the lesion which most directly and efficiently tends to give rise to this effect; but this lesion is exceedingly infrequent.

The occurrence of dropsy, other things being equal, in cases of mitral or aortic lesions, will depend, not immediately on the nature and extent of these lesions, but on conditions induced thereby which relate to the right side of the heart. Dilatation of the right ventricle, or weakness from fatty degeneration and other causes, precedes, in the great majority of cases, the occurrence of dropsy.

Dropsy, therefore, is an event which usually belongs to an advanced period of organic disease, and it is frequently a precursor of fatal termination. Enlargement of the right side of the heart, especially if accompanied by degeneration of structure or great muscular weakness, may induce dropsy when valvular lesions are not present. The occurrence thus, when aortic or mitral lesions are present, is evidence that the effects of these lesions on the right side of the heart, which have been considered under another head, have taken place.

Embolism. Arterial obstructions by vegetations or fibrinous masses detached from the valves or orifices of the heart. The obstruction is carried onward with the current in the course of the circulation, until it reaches an arterial trunk smaller than its own dimensions. Here it is arrested, obstructing the passage of blood in the artery and its branches beyond the point at which they are lodged.

Emboli from within the heart, in cases of chronic valvular lesions, are derived, in the vast majority of cases, from the left ventricle, since lesions affecting the valves of the right side of the heart are exceedingly infrequent.

Emboli derived from within the heart are sometimes calcareous. They may cause apoplexy, coma, paralysis, and softening of the brain, by obstructing the cerebral circulation. They may even cause typhoid symptoms and petechial eruptions.

SYMPTOMS AND PATHOLOGICAL EFFECTS REFERABLE TO THE RESPIRATORY SYSTEM.

The phenomena referable to the lungs, irrespective of associated or intercurrent pulmonary affections, depend, for the most part, on vascular engorgement of these organs. Congestion of the lungs is an immediate result of an impediment to the free admission into the left auricle, of blood from the pulmonary veins. An impediment exists whenever the left auricle is over-distended with blood; and over-distension of this auricle occurs as a consequence of any interruption of the blood-currents through the orifices of the left side of the heart. Obstructive lesions at the mitral orifice especially give rise to pulmonary congestion. Aortic lesions, obstructive and regurgitant, also, sooner or later, are followed by over-distension and dilatation of the left auricle and consequent congestion of the lungs. The engorgement of the lungs arising from valvular lesions gives rise to important pulmonary symptoms without any other superinduced affection of these organs. The most prominent of these symptoms are dyspnœa, cough, muco-serous expectoration, and hæmoptysis. Certain pulmonary affections appear in some cases to be dependent, directly and exclusively, on over-distension of the vessels, namely, extravasation of blood, or apoplexy of the lungs, and œdema. The existence of valvular lesions thus involves a liability to bronchitis, pneumonitis, pleurisy, and emphysema.

Dyspnœa is a symptom more or less prominent in the great majority of cases. It occurs earlier and is more marked in cases of mitral than aortic lesions, because the former tend more directly, and in a greater degree, to engorgement of the pulmonary vessels. In most cases of either mitral obstruction or regurgitation, dyspnœa is the first symptom which occasions inconvenience. The patient often complains of this symptom alone, or chiefly, for a considerable period. In cases of aortic lesions it occurs later, and is oftener preceded by palpitation or other symptoms, referred by the patient to the heart.

The intensity of dyspnœa varies greatly in the different cases of valvular affections in which this symptom is present, and in the same case at different periods. It consists, at first, of a slight deficiency of breath on exertion. This progressively increases until active exercise becomes insupportable. Other cases are characterised by paroxysms of difficult breathing when not provoked by exercise, and by more or less difficulty which is constant. Affections of the pulmonary organs, super-added to congestion, contribute to increase the amount of dyspnœa. This dyspnœa has been designated as *orthopnœa* when extreme, and also as *cardiac asthma.*

Cough and expectoration are usually present when valvular lesions have induced considerable pulmonary engorgement. The expectoration is muco-serous in its character. The prominence of the cough and the charater which the expectoration presents will serve to indicate, on the one hand, merely congestion of the bronchial membrane, or, on the other hand, a superinduced pulmonary affection.

Hæmoptysis is a symptom which occurs in a pretty large proportion of cases of valvular lesions attended with a marked degree of engorgement of the lungs.

Hæmorrhagic extravasation, pneumorrhagia, or pulmonary apoplexy, involves the same pathological explanation as hæmoptysis, but occurs much more frequently than the latter. It is an occasional effect of engorgement. In most of the cases in which it occurs there exists mitral contraction.

Hæmoptysis and hæmorrhagic extravasation occasionally co-exist.

Pulmonary œdema is another pathological effect attributable directly to over-distension of the vessels of the lungs. This event takes place much more frequently than extravasation of blood. Occurring alone, or irrespective of dropsical effusion elsewhere, it belongs among the events incident to an advanced stage of valvular lesion. As a rule, whenever events of importance referable to the respiratory system become developed, valvular lesions have existed for a considerable length of time, and have led to more or less enlargement of the heart. Certain pulmonary affections, not due directly or exclusively to the congestion proceeding from valvular lesions, are more apt to occur under these circumstances than if the latter did not exist. The lesions thus indirectly predispose to the development of these affections. Emphysema of the lungs is one of these affections.

The congested state of the bronchial mucous membrane renders it prone to inflammation. *Bronchitis* is a frequent complication of valvular lesions after they have induced pulmonary engorgement. This complication developed when the lungs are already congested, in connection with cardiac lesions, dyspnœa becomes more or less prominent. The co-existence of bronchitis not only adds to the distress incident to valvular lesions, which interfere with the pulmonary circulation, but, if severe or extensive, often places the patient in immediate danger—the accumulation of mucus within the bronchial tubes, together with the diminished calibre of the tubes from swelling of the membrane, inducing suffocation.

Dropsical effusion into the pleural sacs rarely occurs to much extent independently of general dropsy. When it does take place, the compression of the lungs by the effused liquid abridges their functional capacity, aggravates the dyspnœa, and hastens a fatal issue.

SYMPTOMS AND PATHOLOGICAL EFFECTS REFERABLE TO THE NERVOUS SYSTEM.

It is a common impression that various symptoms denoting cerebral disorder, such as cephalalgia, vertigo, tinnitus aurium, muscæ volitantes, etc., etc., are usually observed, sooner or later, during the progress of cardiac disease. These symptoms are often observed in persons not affected with disease of the heart, and hence would possess small diagnostic significance were they more frequently present; but, the truth is, they occur in only a small proportion of cases, at least in a marked degree.

Valvular lesions, accompanied by enlargement of the heart, have been supposed to involve a strong liability to apoplexy. We may conclude that apoplexy is very rarely due, distinctly or exclusively, to the condition of the heart, but that the changes which the cerebral vessels undergo, or other circumstances, generally play an important part in its production. And of the two conditions which tend directly to affect the circulation in the brain, namely, obstruction at the right side of the heart, and hypertrophy of the left ventricle, the former must be considered as most likely to lead to serious results.

Apoplexy occurring in connection with cardiac lesions, generally depends on extravasation of blood. Under these circumstances, paralysis of course ensues; if the apoplectic attack do not prove suddenly fatal, the patient is found to be hemiplegic. Vegetations, or masses of fibrin from within the cavities of the left side of the heart, being detached, are liable to become fixed in an artery of the brain, and give rise to apoplectic seizures with hemiplegia, or to the latter without the former.

Arterial obstruction gives rise to apoplectic phenomena and paralysis, by lessening the supply of blood to certain portions of the cerebral substance.

Aside from apoplexy and paralysis, various symptoms already mentioned, namely, pain, vertigo, tinnitus, etc., are occasionally associated with valvular lesions. Apoplexy and paralysis, depending either on an extravasation which involves a morbid condition of the cerebral vessels or an arterial obstruction from emboli, are usually not preceded by premonitions referable to the brain. This is a practical point to be borne in mind, in order that needless apprehension be not entertained on the part of physician or patient, and measures employed with a view of warding off an attack of apoplexy or paralysis, which, being uncalled for, will be likely to be not only unnecessary but injudicious. In the cases in which there is of necessity more or less cerebral congestion, the superficial veins of the neck being swelled or pulsating, marked cerebral symptoms are by no means uniformly present. Headache, dullness of the intellect, listlessness, drowsiness, etc., are symptoms which, in a certain proportion of cases of this description, are more or less marked, and are probably due to abnormal fullness of the cerebral veins. These symptoms of cerebral oppression are sometimes marked in cases in which, either from obstruction of the right side of the heart, or imperfect oxygenation of the blood, the prolabia and surface of the body present a livid appearance.

The *sleep* of patients affected with cardiac disease is frequently imperfect. They complain often of frightful dreams. This is generally associated with dyspnœa, and appears to be owing to disturbed respiration rather than to disordered cerebral circulation. Moaning in sleep is a symptom observed in some cases when the patient is not wakeful nor conscious of any morbid sensations.

A symptom which may be included among the events referable either to the nervous or respiratory system, is noticed in some cases, namely, a choking sensation analagous to that experienced in painful emotions when an effort is made to refrain from weeping. The mental condition of patients affected with organic disease of the heart may be noticed in this connection. The contrast presented, in this respect, with patients affected with merely functional disorder, has been already referred to. Persons with organic disease which has given rise to grave symptoms, such as palpitation, dyspnœa, dropsy, etc., are generally free from excitement and apprehension. They often seem to be remarkably indifferent or apathetic.

SYMPTOMS AND PATHOLOGICAL EFFECTS REFERABLE TO THE DIGESTIVE SYSTEM AND NUTRITION.

The phenomena manifested in connection with the digestive apparatus, in cases of valvular lesions, proceed from congestion of the systemic venous system. Assuming the lesions to be either mitral or aortic, or both, congestion of this order of vessels depends on the effects of these lesions on the right side of the heart. It may be stated that, as a rule, the systemic congestion is not sufficient to give rise to important symptoms or pathological effects until dilatation of the right ventricle has taken place, involving overdistension of the right auricle, and, in certain cases, tricuspid regurgitation. The impediment to the free admission of blood from the venæ cavæ into the right auricle, occasions cerebral congestion, as has just been seen. The congestion throughout the body thus induced, as has also been seen, gives rise to venous turgescence and general dropsy. The abdominal viscera indirectly participate in the effects of this impediment at the right ventricle, owing to their vascular relations to the vena cavæ being through the intervention of the portal system. In view of the anatomical peculiarities of the latter, it is obvious that, of the organs comprising the abdominal viscera, the liver is first affected by an obstruction at the right side of the heart. The pressure of the portal branches on the biliary tubes may occasion an undue accumulation of bile in the latter. (Flint.)

I have observed obstinate cases of jaundice in several cases of valvular disease of the heart.

Sections of the organ then present that peculiar aspect commonly known as the "nutmeg liver."

Extending beyond the liver to the portal vein and its radicles, the congestion affects finally the stomach and intestines, the spleen and the pancreas. Congestion of these orgâns is a secondary effect due directly to the mechanical obstacle to the passage of blood through the liver.

The successive steps, then, in the series of congestive effects dependent on valvular lesions are: obstruction or regurgitation at either the mitral or aortic orifice, or at both situations; dilatation of the right ventricle, following engorgement of the pulmonary vessels; over-distension of the right auricle, with or without tricuspid regurgitation, involving an impediment to the free transmission of blood from the vena cavæ; congestion of the hepatic veins and its radicles, the intralobular veins; congestion of the terminal branches of the portal vein; congestion of the vena portæ and its radicles in the abdominal viscera, these vessels furnishing the blood for the portal circulation.

Enlargement of the liver is an occasional effect incident to valvular lesions, as well as to enlargement of the heart without these lesions.

Cirrhosis is not a frequent complication of valvular affections of the heart. The event denoting co-existing cirrhosis is hydroperitoneum in a degree disproportionate to the general dropsy.

There are many other disorders in a measure incident and common, such as dyspepsia, hæmorrhage from the bowels, hæmorrhoids, enlargement of the spleen, etc., which you can study at your leisure in the various works on diseases of the heart.

SYMPTOMS AND PATHOLOGICAL EFFECTS REFERABLE TO THE GENITO-URINARY SYSTEM.

The renal or emulgent veins terminating in the vena cava descendens, the kidneys must participate in the congestion of the systemic venous system arising from an impediment at the right side of the heart. These organs are affected more directly than the abdominal viscera, which are tributary to the portal vein. So soon as valvular lesions have led to the anatomical conditions involving an obstruction extending to the vena cavæ and their branches, renal engorgement necessarily ensues. Congestion of these organs is generally observed in examinations after death in valvular disease accompanied by dilatation of the cavities of the right side of the heart. Venous congestion, under these circumstances, does not uniformly occasion a greater flow of urine than in health. Indeed, the quantity of urine is oftener diminished than increased, a fact going to show that the diuresis depends on the amount of blood conveyed to the kidneys by the arteries, or on conditions pertaining to the blood itself, rather than on accumulation in the renal veins. The urine is frequently scanty, even when the venous obstruction is sufficient to give rise to general dropsy. We may have albuminuria, owing to the mechanical pressure incident to venous congestion. It does not constitute evidence of structural changes of the kidney, or Bright's disease, when it is in small quantity, transient in duration, and notably fluctuating. (Flint.)

Moreover, hyaline casts are wanting when albuminuria is only a symptom of disease of the heart, and the specific gravity of the urine, instead of being diminished, is usually increased.

The degenerations of structure included under the name Bright's disease, are sometimes associated with valvular lesions of the heart.

The co-existence of structural degeneration of the kidney is shown, as already intimated, by the degree and constancy of the albuminuria, and by the different varieties of casts of the uriniferous tubes, which the sediment of the urine is found to contain when subjected to microscopical examination. The tendency to general dropsy is augmented by this complication; renal and cardiac dropsy are, in fact, combined. As regards the generative functions, Flint has observed, that in cases in which lesions had existed for a considerable period before puberty, the genital organs, including, in females, the mammary gland, attained to a full development.

SYMPTOMS AND PATHOLOGICAL EFFECTS REFERABLE TO THE COUNTENANCE AND EXTERNAL APPEARANCE OF THE BODY.

Lividity of the prolabia and face, which may be apparent over the whole surface of the body, denotes either venous congestion or imperfect oxygenation of the blood. The latter is incident to the pathological effects taking place in the lungs; the former, to obstruction at the right side of the heart. But both conditions may be conjoined. A dusky hue of the face, combined with œdema, is quite distinctive of cardiac, as contrasted with renal, dropsy. I need not mention the painful expression of the countenance in a patient suffering from what is known as cardiac asthma. Dr. Hope gives a graphic picture of the terrible sufferings of such patients.

Some cases of valvular disease are characterized by pallor of the complexion. The co-existence of Bright's disease is likely to lead to this effect. But it is observed in some instances when the kidneys are not affected. It then depends on alterations of the blood proceeding from other causes.

An anæmic condition is incident, in a certain proportion of cases, to cardiac disease uncomplicated with an affection of the kidneys. Analysis of the blood shows a notable deficiency of albumen, together with a reduction in the relative proportion of blood corpuscules and fibrin.

The accumulation of blood in the right chambers of the heart induces, in addition to abnormal fullness of the superficial veins, a congestive state of the capillary vessels, causing the surface of the body to present an appearance like that produced by exposure to cold. The redness disappears on pressure, and returns, more or less slowly, after the pressure is removed. The appearance is not unlike that observed in typhus and typhoid fever, although the rationale is by no means the same.

Erythema, affecting portions of the surface, occurs in some cases not associated with œdema. The lower extremities are most apt to be affected. Flint met with an instance in which the extremities of the fingers and a portion of the palms presented permanently an erythematic redness. On the other hand, in a patient with considerable mitral regurgitation, the fingers at times were bloodless, being as pallid and cold as those of a corpse.

LECTURE XI.

VALVULAR DISEASES OF THE HEART.

Physical Signs and Diagnosis of Valvular Diseases of the Heart — Endocardial or Valvular Murmurs — Mitral Direct Murmurs — Mitral Regurgitant Murmurs — Aortic Direct Murmurs — Aortic Regurgitant Murmurs — Recapitulation of Murmurs — Purring Tremor — Diagnostic Characters of Mitral Lesions — Diagnostic Characters of Aortic Lesions — Of Tricuspid Lesions — Of Pulmonic Lesions — Treatment of Disorders Resulting from Valvular Lesions.

GENTLEMEN: We have thus far, in lecturing on Diseases of the Heart, gathered from the latest and standard works, together with our own observations, and have omitted much that might be said, while we have endeavored, by careful study, to give you, in few words, the prominent points which will aid you in the investigation of the diseases of the heart. Our clinics do not yet furnish us with opportunities in this direction, and for this reason have I taken special pains to treat the various affections in a plain and concise way. But you must not stop here, but investigate for yourselves.

We will devote this hour to the consideration of the

PHYSICAL SIGNS AND DIAGNOSIS OF VALVULAR LESIONS

Cardiac murmurs originate either within the heart, or on the peripheral surface of the organ.

In treating of endocardial murmurs, the practical points to be considered relate to the different character which they present, the morbid conditions which they denote, their significance and value as signs of disease, and their application to the diagnosis of valvular affections. These murmurs may be produced within the cavities of the heart, at the auriculo-ventricular or the ventriculo-arterial orifices, and within the aorta or pulmonary artery, near the junction of these vessels with the ventricles. It is practicable often, if not generally, to determine from which of the cavities, orifices, or vessels mentioned, emanate the murmurs heard in individual cases.

The importance of this localization, as pointing to the seat of the lesions which occasion the murmur, is obvious: to determine the existence or non-existence of valvular disease; to determine the particular situation of structural lesions; to determine the character of lesions, and certain of their effects on the blood-currents through the different orifices.

Endocardial murmurs are not always due to lesions of structure or organic disease. They occur as a result of certain blood-changes and of functional disorder of the heart.

The latter are distinguished as inorganic murmurs, while those dependent on structural changes are called organic murmurs.

Organic murmurs, in the majority of cases, resemble a bellows-sound. Murmurs of this kind are said to be soft murmurs. In some instances they are so feeble as to be just appreciable. In other instances they are so loud as to be heard over the whole chest, and they are sometimes perceived by the patient, especially in the night-time.

Different varieties have been described and named from their resemblance to certain sounds. Enough for practical use is to consider them simply as presenting different modifications and degrees of roughness, the latter being the only distinctive feature worthy of being noted.

Murmurs sometimes have a musical intonation. The sounds have no special pathological or diagnostic significance, except that they denote the existence of organic disease.

The presence of a murmur involves only the fact that there is something abnormal. The presence of a murmur by no means warrants the conclusion, in all cases, that lesions do exist, as will appear more fully after the inorganic murmurs have been considered. The absence of murmur, on the other hand, warrants the conclusion that lesions do not exist, the probability of error being exceedingly small, provided the heart be not, from any cause, greatly enfeebled.

After the systolic contraction of the ventricles, the blood passes through the auriculo-ventricular orifices from the auricles into the ventricles.

The current of blood from the left auricle, through the mitral orifice, into the left ventricle, may be designated the direct mitral current.

The systolic ventricular contractions impel the blood from the cavity of the ventricle into the aorta. The current of blood from the cavity of the left ventricle into the aorta may be distinguished as the direct aortic current. These are the normal blood-currents. If the mitral valves be insufficient, more or less of the blood contained in the cavity of the left ventricle is driven backward by the ventricular systole into the left auricle. Here, then, is a regurgitant current which does not exist when the valves are sufficient. It may be called a mitral regurgitant current. So may we have the aortic regurgitant current. Each of these four currents may give rise to a murmur. A mitral direct murmur begins after the diastolic, or second sound of the heart; or it takes place during the long silence or pause which separates the diastolic and systolic sound, and may be called the mitral diastolic murmur.

A mitral regurgitant murmur being produced by the ventricular systole, commences with the systolic sound; it is, therefore, a systolic murmur, and may be called the mitral systolic murmur.

An aortic direct murmur, also produced by the ventricular systole, is a systolic murmur; it commences with the systolic sound, and may be called the aortic systolic murmur.

An aortic regurgitant murmur, on the other hand, produced by a retrograde current from the aorta into the ventricle after the systolic contraction, commences with the second or the diastolic sound.

Then we have the systolic murmurs, commencing with the systolic or first sound of the heart:

1st. A mitral regurgitant, or a mitral systolic murmur.

2nd. An aortic direct, or an aortic systolic murmur.

Also the diastolic murmurs, commencing with or following the diastolic or second sound of the heart: 1st, A mitral direct, or a mitral diastolic murmur; and, 2nd, An aortic regurgitant, or an aortic diastolic murmur.

The mitral direct, or the mitral diastolic murmur, generally denotes a particular kind of lesion, namely, union of the mitral curtains, leaving a slit-like and more or less contracted aperture between the auricle and ventricle. It may be distinguished as a blubbering sound when this quality is strongly marked. The mitral direct murmur always ends with the ventricular systole. This murmur may be produced —and it may be quite intense—when the mitral valves are not the seat of any lesion. The fact that the mitral curtains are floated out and brought into apposition to each other, by simply distending the ventricular cavity with liquid, is sufficiently established and easily verified.

Now, in cases of considerable aortic insufficiency, the left ventricle is rapidly filled with blood flowing back from the aorta, as well as from the auricle, before the auricular contraction takes place. The mitral curtains, under these circumstances, are brought into co-aptation, and when the auricular contraction takes place, the mitral direct current passing between the curtains, throws them into vibration, and gives rise to the characteristic blubbering murmur.

Mitral regurgitant, or systolic murmur, is most frequently met with in cases of organic disease of the heart. Whenever the mitral valve is insufficient, a portion of the blood contained in the left ventricle is driven backward by the ventricular systole into the left auricle.

The gravity of valvular lesions, as has been seen, depends on the amount of obstruction and regurgitation resulting from them; hence the importance of bearing in mind, that a mitral systolic murmur is not always, strictly speaking, a regurgitant murmur, that is, the murmur may be produced without regurgitation.

Aortic direct or systolic murmur. In proportion as obstruction to the aortic blood-current is involved, evils ensue, namely, accumulation of blood in the ventricular cavity, enlargement of the left auricle, followed by pulmonary congestion, and the more remote consequences which are essentially those resulting from obstruction and regurgitant lesions at the mitral orifice. There are no constant characters pertaining to the murmur itself which enable the auscultator to determine whether the lesions do, or do not, involve obstruction. In a large proportion of the cases of obstructive lesions at the aortic orifice, the valves are involved sufficiently to compromise, to a greater or less extent, their function, and impair the intensity of the aortic second sound. Aside from attention to the aortic sound, the evidence of obstruction, and also of its degree and duration, must be derived from the amount of enlargement of the left ventricle, and the remote effect of the heart affection.

Aortic regurgitant or diastolic murmur. This ranks next to a mitral direct murmur as regards infrequency. The gravity of the lesions represented by this murmur depends on the extent of insufficiency or the amount of regurgitation. Absence of an aortic regurgitant murmur, therefore, is not positive proof that there is no regurgitation. Roughness of the inner surface of the aorta above the aortic valves may occasion a murmur with the retrograde movement of the column of blood within the vessel, although the aortic valves are sufficient. An aortic non-regurgitant diastolic murmur is then characterized by its ending abruptly with the second sound of the heart; whereas an aortic regurgitant murmur continues, more or less, after the second sound.

Localization of the systolic murmurs. The first point is to ascertain whether it be a systolic or a diastolic murmur. If the heart-sounds recur with great frequency, the difference in duration between the two pauses or intervals is scarcely apparent. Whenever there is doubt or difficulty in determining whether a murmur be systolic or diastolic, it is to be remembered that the first or systolic sound of the heart is synchronous with the apex-beat and the carotid pulse. If the beginning of a murmur be coincident with the carotid pulse, it is either an aortic or a mitral systolic murmur. A murmur may be inappreciable, owing to feebleness of the action of the heart. Before deciding, therefore, on the absence of murmur, it is sometimes advisable to excite the heart's action by muscular exertion. If the murmur be a mitral systolic, its maximum of intensity is at or near the apex of the heart. This is to be depended upon as a rule.

If a systolic murmur be an aortic direct murmur, its maximum of intensity is at or above the base of the heart. The particular situation where it is most intense is usually in the intercostal space nigh to the sternum. From the base of the heart it is propogated upward for a greater or less distance, usually more so on the right than on the left side. It is often pretty loud at the sternal notch.

To determine the presence of both these murmurs: If a murmur heard at the apex be transmitted over the left lateral aspect of the chest, and if it be heard at the lower angle of the scapula behind, a mitral regurgitant murmur is present. If, now, a murmur heard at the base be heard over the carotids, there is also present an aortic direct murmur.

Localization of the diastolic murmur. A mitral direct murmur is pre-systolic. It occurs just before the first or systolic sound, and is almost always continued up to that sound. None of the other murmurs occur in the same relation to the first sound of the heart, and hence, this alone is distinctive. Its maximum of intensity is within a circumscribed space around the apex of the heart. If the diastolic murmur be an aortic regurgitant murmur, it commences with, and follows, the second sound of the heart. As no other of the four murmurs under consideration commences with the second sound of the heart, it suffices for its recognition to make out this point; and if it be difficult to determine which of the heart-sounds is the first, and which the second sound, the relation of the murmur to the second sound is shown by the interval between the murmur and the carotid pulse.

RECAPITULATION *of Points involved in the Localization of the Systolic and Diastolic Murmurs referable to the Mitral and the Aortic Orifice.**

SYSTOLIC MURMURS.

Mitral Regurgitant.	*Aortic Direct.*
Maximum of intensity at or near the apex of the heart.	Maximum of intensity at the base of the heart in the second intercostal space, near the sternum. Intensity diminished over body of heart and at the apex.
Comparatively feeble or wanting at the base.	
Not propogated above the base of the heart. Not heard over carotids.	Propogated above the base of the heart and generally heard over carotids.
Often heard over left lateral surface of chest.	Rarely heard over left lateral surface of chest.
If heard in the interscapular space, most intense near the lower angle of scapula.	If heard in the interscapular space, most intense as high as the spinous ridge of scapula.
Aortic second sound weakened in proportion to the amount of regurgitation, but distinct.	Aortic second sound often weakened, and more or less indistinct.
Pulmonic second sound often intensified.	Pulmonic second sound less frequently intensified.
Mitral valvular element of the first sound more or less impaired.	Mitral valvular element of the first sound not impaired.

DIASTOLIC MURMURS.

Mitral Direct.	*Aortic Regurgitant.*
Occurs just before the systolic or first sound, and ends with the occurrence of this sound. Usually vibratory or blubbering in quality.	Commences with and follows the diastolic or second sound. The quality usually soft.
Maximum of intensity over apex of heart.	Maximum of intensity over body of heart, near the sternum.
Generally not appreciable at the base of the heart.	Generally appreciable at the base of the heart.
Mitral valvular element of first sound impaired.	Mitral valvular elememt of first sound not impaired.
Pulmonic second sound often intensified.	Pulmonic second sound less frequently intensified.

In connection with murmurs, it may be safe to say, that they show organic lesions are accompanied by an organic murmur in the great majority of cases.

Lesions which occasion neither obstruction nor regurgitation may give rise to murmurs.

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* From Flint on Diseases of the Heart.

Purring tremor. This term is applied to a sense of vibration, or thrill, felt on placing the fingers or the hand on the præcordia. It resembles the sensation given to the hand by the purring of a cat. It is doubtless due to tremulous movements of the heart. A well-marked purring tremor may be considered as a sign denoting valvular lesions associated with hypertrophic enlargement of the left ventricle. It occurs when the mitral orifice permits free regurgitation, and may also occur in aortic lesions.

DIAGNOSTIC CHARACTERS OF MITRAL LESIONS.

Physccal signs: — An endocardial systolic murmur is present in the majority of cases, with the traits which distinguish a mitral regurgitant murmur, viz.; its maximum of intensity at or near the apex of the heart, the intensity diminishing as the stethoscope is carried upwards over the body of the heart; generally feeble or lost above the base of the organ; not propogated into the carotids; often diffused over the left lateral surface of the chest; and not infrequently heard on the posterior surface, at the lower angle of the scapula, and in the interscapular space below the level of the spinous ridge of the scapula; the murmur more or less intense; generally soft, but sometimes rough, and occasionally musical. The aortic second sound is weakened; the pulmonic second sound is often intensified. Enlargement of the heart exists in the majority of the cases which come under observation.

Pain is rarely present. Abnormal force of the heart's action and palpitation denote consecutive enlargement, but the symptoms are often not prominent.

The pulse is small and weak, and, in an advanced stage, it becomes irregular and intermitting; inequality of the pulse is, in some measure, characteristic of obstructive lesions. Turgescence of the jugular and other veins, lividity, or cyanosis, and dropsy occur at an advanced period, when dilatation of the right cavities of the heart has been induced. Dyspnœa is more or less marked. Cough and muco-serous expectoration occur frequently. Hæmoptysis is of frequent occurrence, and extravasation of blood in the lungs, or pulmonary apoplexy, takes place occasionally. Œdema of the lungs is not infrequent.

DIAGNOSTIC CHARACTERS OF AORTIC LESIONS.

Physical signs. — An endocardial systolic murmur is present in the majority of cases, with the traits which distinguish an aortic direct murmur, viz.: its maximum of intensity at the base of the heart; comparatively feeble and often lost at the apex; propagated upward in the direction of the aorta, and into the carotids; not diffused over the left lateral surface of the chest; and if heard on the posterior surface, either limited to, or most intense in, the interscapular space on and above the level of the spinous ridge of the scapula. Murmur more or less intense; generally soft, but sometimes rough. The aortic second sound of the heart is often weakened and indistinct; the pulmonic second sound is much less frequently intensified than in cases of mitral lesions. Enlargement of the heart exists in the majority of cases. An aortic regurgitant murmur is present in a certain proportion of cases.

Pain is oftener present than in cases of mitral lesions, but is often absent. Abnormal force of the heart's action and palpitation, as a rule, are more prominent symptoms than in cases of mitral lesions.

The pulse in cases of aortic regurgitation is quick, jerking, collapsing, and a longer interval than natural is sometimes observed between the apex-beat or systolic sound and the pulsation in remote arteries.

Visible pulsation of superficial arteries is frequently marked. Turgescence of the jugular and other veins, and dropsy, occur at a later period than in cases of mitral lesions, and oftener wanting.

Dyspnœa is less marked. Cough and muco-serous expectoration and hæmoptysis are comparatively infrequent. Pulmonary apoplexy rare. Œdema of the lungs less frequent.

DIAGNOSTIC CHARACTERS OF TRICUSPID LESIONS.

Physical signs.—The rule, that a murmur is present in the vast majority of cases, cannot be applied to tricuspid lesions; and hence, absence of murmur is not proof that the latter do not exist. A tricuspid regurgitant murmur, however, is sometimes observed. It is rarely intense or rough, and is usually low in pitch. Its maximum of intensity is at or above the xiphoid cartilage.

Tricuspid lesions, not congenital, are in most instances associated with lesions of one or more of the valves of the left side of the heart. One case is reported of the diagnosis being based on the fact that the presystolic murmur was heard, not only around the apex, but at, and to the right of, the ensiform cartilage.

Regurgitant and obstructive lesions, situated at the tricuspid orifice, do not produce those immediate effects on the respiratory system and the pulse which pertain to analogous lesions seated at the mitral orifice. Their immediate effects are manifested in the systemic venous system. Congestion of the systemic veins is a direct result, tending to general dropsy. Cerebral apoplexy is more liable than in mitral or aortic lesions.

DIAGNOSTIC CHARACTERS OF PULMONIC LESIONS.

Physical signs.—Lesions situated at the pulmonic orifice may give rise to a murmur with the first sound of the heart, which may be called a pulmonic direct murmur. This murmur has its maximum of intensity in the second intercostal space on the left side of the sternum, the situation where the pulmonic second sound of the heart may be isolated from the aortic second sound.

Pulmonic lesions, however, exclusive of congenital malformations, are so rare, that the opportunities of any clinical observer, however large his experience, for studying the physical signs, are extrenely limited.

Hypertrophy of the right ventricle, which is produced by obstructive or regurgitant lesions of the pulmonic orifice, involves augmented intensity of the tricuspid valvular element of the first sound, and an impulse in the epigastrium.

The primary effect of obstructive or regurgitant lesions situated at the pulmonic orifice, is enlargement of the right ventricle. The secondary and remote effects, and the symptoms thereon dependent, are essentially those which are occasioned by tricuspid lesions, being due to distension of the right auricle, tricuspid regurgitation, and congestion of the systemic veins.

TREATMENT OF DISEASES RESULTING FROM VALVULAR DISEASES OF THE HEART.

It is evident that the anatomical changes which the valves and orifices of the heart have undergone, are not amenable to any medical treatment. The lesions existing must remain. The most that can be done is to retard their progress and control their primary effects.

Cases may, however, occur where suitable remedies may set up such an action in the system, as may result in the partial or complete removal of certain morbid products deposited on or about the valves. A thorough trial of those remedies known to us as *antipsorics* may give you excellent results.

You need not feel discouraged in the treatment of valvular diseases, nor should you discourage your patients, for in general no immediate danger is present, even when those lesions exist which involve more or less obstruction or regurgitation.

For the treatment of the *primary* effects of valvular diseases, I refer you to the treatment of enlargement of the heart.

The *secondary* effects of valvular lesions do not generally appear so long as the enlargement of the heart is by *hypertrophy*, unless, from fatty degeneration or some other cause, weakness of the organ has been induced. Flint says that obstruction and regurgitant lesions tend first, as a rule, to produce hypertrophy, the muscular walls increase in thickness up to a certain limit. When this limit is reached, dilation of the cavities ensue, and, finally, predominates over the hypertrophy. So long as the hypertrophy lasts the increased *power* of the heart compensates for the immediate consequences of the obstruction and regurgitation.

But when dilatation takes place, the real danger appears. It is then that other organs become affected, and a train of evils follow which will require your watchful care to relieve and arrest.

The main objects of *treatment*, before these resulting affections have appeared are mainly *preventive*. (1) You must seek to prevent or retard the progressive anatomical changes. (2) You must strive to prevent weakness and consequent dilatation of the heart.

As I have just now stated, you will find this treatment fully set forth in your notes on hypertrophy and dilatation.

You must ever bear in mind, that in the treatment of the secondary and remote effects of these lesions, the *condition of the heart* should not be forgotten. You cannot successfully treat the local congestions in such cases by specific remedies directed solely to the organ affected. For example, *leptandra* will not as often remove a jaundice caused by cardiac disease as will *digitalis*, because the latter has a specific influence over the heart.

These secondary affections are mostly dependent on *passive* congestion, and as they arise from a weakened circulation, those cardiac remedies which strengthen the force of the circulation will give the most relief. I have enumerated these in Classes I., II., and III. in "Dilatation."

Dyspnœa, otherwise known as cardiac asthma, or breathlessness, will often claim your special attention. In advanced cases you can only palliate, but you can do much with such medicines as *digitalis*, *hydrocyanic acid*, *arsenic*, *lobelia*, *cuprum aceticum*, *phosphorus*, and *tartar emetic*.

Cough can be alleviated by the same remedies, aided by *hyoscyamus*, *conium*, *lycopus*, etc.

Expectoration in valvular disease should be encouraged rather than checked, for it often relieves the congestion. When it becomes too profuse, it may be lessened by *squilla*, *tartar emetic*, *cubebs*, *copaiva*, *ammonia*, *ipecac*, and similar remedies.

Intercurrent pulmonary affections, such as bronchitis, pleurisy, pneumonia, are to be treated in the ordinary manner.

The *disorders of digestion* and *hepatic affections* are sometimes quite obstinate. If you will study the provings of *digitalis*, you will observe the peculiar and prominent derangement of the gastric and hepatic functions which it causes. It causes these disorders by deranging the action and impulse of the heart. *Digitalis* is our most reliable remedy in similar cases; and next in value come *nux vomica*, *ignatia*, *china*, *cornus*, *æsculus*, *hydrastis*, *podophyllum*, *leptandra*, *lycopodium*, *sulphur*, and *benzoic acid*.

Cerebral congestions are to be met with *digitalis*, *nux vomica*, *opium*, *glonoine*, *agaricus*, *arnica*, *solanum*, aided by hot mustard foot and hand baths. The extremities must be kept warm and full of blood.

General dropsy is one of the most troublesome of the secondary effects, and will tax your skill greatly. Remember that the *kidneys* are not primarily in fault. The co-existence of Bright's disease gives the disease a double character.

Any remedy which will aid the heart by giving it increased power will benefit the dropsy. It is not necessary that the remedy should be a kidney remedy. The best remedies for cardiac dropsy may be arranged in two classes, namely:

I. Those which act primarily on the heart: *digitalis* and its analogues; *nux vomica* and *china* and their analogues.

II. Those which act specifically on the kidneys: *apocynum cann.*, *asparagus*, *eupatorium purp.*, *benzoate of ammonia*, *colchicum*, *asclepias syriaca*, *squilla*, *potass nitras* and *acet.*, etc.

In cases of co-existing Bright's disease, I have found *sulphuric acid* to act in a wonderfully efficient manner.

It is a significant fact that allopathic authorities are quite unanimous in asserting, that from experience they find that by combining a remedy of my Class I. with one of Class II., they are enabled to remove cardiac dropsy more rapidly than in any other way. A favorite combination with them is *digitalis* and *squills*. Now, we need not combine medicines to get these good effects. Better results can be gained by alternation. You will, according to my experience, get prompt action from an alternation of *digitalis* and *apocynum cann.*, or *china* and *asclepias*, or *nux* and *benzoate of ammonia.*

Obstinate cases have been reported where the internal administration of remedies failed to remove this form of dropsy, but in which their *external* application over the abdomen and kidneys was successful.

If your dropsical patient is anæmic, give him *ferrum* (the *iodide* is the best,) and advise a strong nitrogenous diet.

Finally, gentlemen; do not always inform your patients of the presence of organic disease of the heart. Such an announcement will militate against your best chosen remedies, by depressing your patient's spirits, and thus lowering the vital energies. Better is it to encourage; and only allude to the heart in a vague or indirect manner.

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